

ROADS AND STREETS

JULY 1951



How J. D. ADAMS MFG.
CO. mounts the front wheels
and kingpin of its Model 30
Traveler on Timken
bearings.

Does two jobs on the double with TIMKEN® bearings

THE photo above shows the new Adams Traveler picking up a heavy windrow of material excavated for pavement widening strips on an Illinois state highway. Built by J. D. Adams Manufacturing Company, the Timken® bearing equipped Traveler picks up and loads any kind of windrowed material, such as sod, gravel, bituminous mix, or scarified black top. And it actually loads as it travels!

J. D. Adams mounts front wheels, kingpin, upper conveyor bevel gear drive and feeding mechanism bevel gear drive of the Traveler on Timken tapered roller bearings. With Timken bearings at these vital points, the Traveler is assured long life, minimum maintenance, trouble-free service. Loads are handled faster, with less wear on moving parts.

Timken bearings' true rolling motion plus an extremely smooth surface finish make friction negligible. Line contact between rollers and races gives extra load-carrying capacity. Tapered construction enables Timken bearings to take any combination of radial and thrust loads; moving parts are held in proper alignment.

Timken bearings permit tighter closures that keep out dirt and moisture, keep lubricant in. Maintenance time and

material costs are cut to a minimum. And because they are made of Timken fine alloy steel, Timken bearings normally last the life of the machine.

You can get all these advantages by specifying bearings with the trade-mark "Timken" whenever you build or buy. They are backed by over 50 years of bearing research and development. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

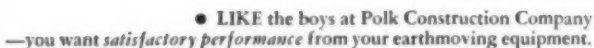


Polk Construction Company
GENERAL CONTRACTORS
1101 N. 1st St.
TALLAHASSEE, FLORIDA
FEBRUARY 19, 1951

Mr. Troy W. Deal, Jr.,
Sales Manager
Square Deal Machinery & Supply Co.
Box 1148
Orlando, Florida

[illegible]

Yours very truly,
CONSTRUCTION COMPANY

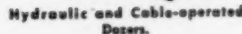
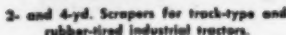
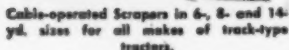


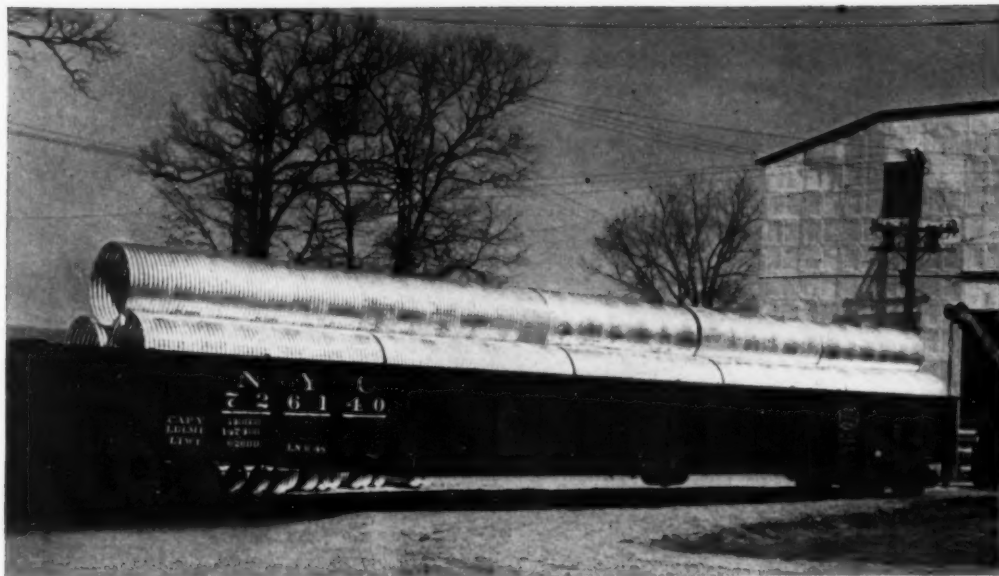
It means the capacity to haul bigger payloads each trip . . . speeds that let you make more trips per hour. It means power to spare in the toughest going . . . power that's *usable* in the pit, on the haul road, on the fill. It means dependability . . . the ability to keep up the pace shift after shift.

Your LPC distributor can give you facts and figures on Motor Scraper performance . . . see him before you bid on your next job. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

On this Polk Construction Co. job at Minneola, Florida for the State Road Dept., yardage ran over 300,000 cubic yards. Part of the job included clay stabilization work with hauls up to 5 miles one way. With heaping 14-yd. payloads, the Motor Scrapers made the 10 mile load-haul-spread cycle at an average speed of 14 mph!

CHOATE





GALVANIZED STEEL CULVERTS

Do the Job at Lower Cost

Culvert pipe made of copper-bearing galvanized steel does a superior job in highway and airfield drainage systems. It has much better resistance to corrosion—it has considerably greater strength—it has a slightly higher modulus of elasticity—and it costs less than culvert pipe made of other commonly used metals. Furthermore, pipe of this material is easy to handle and simple to install.

Bethlehem does not fabricate culvert pipe, but it does manufacture high-quality Beth-Cu-Loy galvanized steel stock used by culvert pipe fabricators. This steel more than satisfies the minimum specifications for culvert material set up by the American Association of State Highway Officials. It carries a tight, 2-oz zinc coating that satisfies the diagonal triple-spot tests.

Bethlehem furnishes this sheet stock both flat and corrugated in gages from 8 to 16, inclusive. Lengths range from 60 in., minimum to 156 in., maximum.

If you are bidding on any kind of drainage job, it will pay you to find out more about culvert pipe made of Beth-Cu-Loy galvanized steel. Write or phone any of our sales offices for complete details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



Beth-Cu-Loy *GALVANIZED* **Culvert Sheets**

When writing advertisers please mention **ROADS AND STREETS**, July, 1951

ROADS AND STREETS

July, 1951 • Vol. 94 • No. 7

Roads and Streets represents 59 years of continuous publishing in the highway field; combined with Engineering & Contracting and Good Roads Magazines, established in 1892

E. S. GILLETTE, Publisher



HALBERT P. GILLETTE, Editor-in-Chief

H. J. CONWAY, Assistant Publisher

In This Issue

Coming Articles

Big Turnpike Paving Job

How contractors are doing it on the largest, fastest asphalt paving job in history. Several feature articles in preparation by the R. & S. editors.

President's Traffic Safety Conference Report

Sorry this got crowded out of the July issue. How engineering solutions are being coordinated with the many problems of enforcement, accident reporting, traffic planning, etc.

Flagmen on Road Jobs

Every road contractor as well as highway department executive will be interested in a forthcoming summary of Minnesota's new flagmen regulations. Also coming: How 12,000 vehicles daily are being passed safely through a multi-lane Ohio concrete paving project—the contractor working new tricks to earn his traffic-control pay item.

Raising a Bridge

Part of a reconstruction along the Ohio River Road, planned to assure 365-day traffic despite floods.

A Tennessee County Finds Real Economy in Soil-Cement

Soil cement base construction methods, unit costs, and service under traffic, reported in an early issue.

Snow and Ice Control

Several articles immediately ahead.

Edens Parkway Opens

This expressway link Northwest of Chicago represents latest in "all-out" limited access design and construction. Pictorial story planned.

Who's using Radiotelephone?

A committee report will summarize data on radio's fast gaining acceptance as a highway department management tool.

HAROLD J. McKEEVER, Editorial Director
C. T. Murray, Managing Editor
Col. V. J. Brown, Associate Editor
W. W. VanStone, Production Editor

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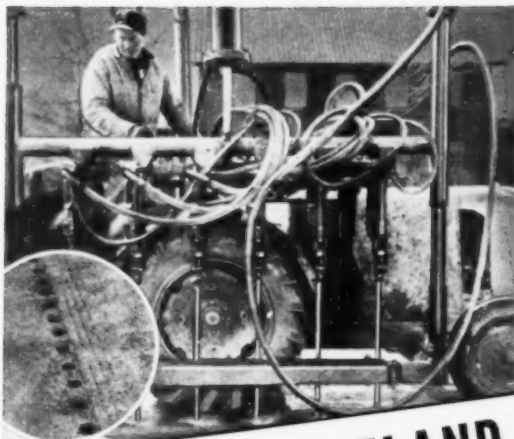
A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

GILLETTE PUBLISHING COMPANY

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22 West Maple Street, Chicago 10, Ill.

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Acceptance under Act of June 5, 1934, Section 3464 P.L. & R. Authorized April 16, 1948, at Mount Morris, Illinois. Published monthly. Subscription price \$5.00 per year.



Multiple Drill Rig for Line-drilling

This self-propelled rig has saved hundreds of dollars for contractors everywhere. It consists of 6 Le Roi-CLEVELAND H10 drills mounted on a Le Roi Centaur Tractor. All drills are attached to a single air cylinder controlled from the driver's seat, and feed into the concrete or pavement together. The rig is ideal for line-drilling and the web between the drill holes can be broached easily with Le Roi-CLEVELAND paving breakers. That's how it provides a fast, low-cost method of preparing pavement for trenching. Freedom from over-break permits clean, smooth resurfacing when job is finished.

Le Roi-CLEVELAND Announces 3 New Air Tools for Contractors

...they save work, cut costs, and help keep
jobs on schedule



18-lb. H22 Hornet Rock Drill

Handy is the word for this new tool. Available with spade or tee handle in wet or dry types. Fast drilling, easy holding, strong rotation, low air consumption, built-in lubricator, replaceable spacer bushing, 2-piece chuck and sleeve for $\frac{7}{8}$ " hex x $\frac{3}{4}$ " steel. Built like a big rock drill. Ideal for foundations, demolition, plumbing, sewers, conduit, pop-holing, dimension stone, etc.



Hand crank or . . .



Model DR34 Light Wagon Drill



... air motor
for fast, easy
adjustments



Here's a truly lightweight wagon drill. It's ideal for quarries, road jobs, mining — every highway department should have one. Can be supplied with 2 sizes of rock drills — either the famous Le Roi-CLEVELAND 45-lb. H10 or the 80-lb. H23 with $\frac{3}{4}$ "-inch bore. Feed action furnished by patented 2-in-1 air feed cylinder. 7-foot feed travel gives you 6-foot steel changes. Conveniently located controls permit selection of right feed pressure for highest drilling speed in any kind of rock. Strong, direct blowing easily cleans 20-foot holes. You can drill at practically any angle — toe holes with machine 4 inches from ground or flat holes $7\frac{1}{2}$ feet from the ground. Adjustments are easily and quickly made by either hand crank or air motor.

No matter what your drilling job is — you can do it better, faster, for less with Le Roi-CLEVELAND rock drills and breakers powered with Le Roi Airmaster Compressors. Write for complete information or see your nearby Le Roi distributor.

RD-51



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MACK TRUCKS

See You Through

• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance...confident that even if trucks should become hard to replace your Mack will see you through...that it will stay on the job delivering dependable service mile after mile and year after year.

Thousands of truck users in World War II found out by actual experience that they were indeed "Lucky to own a Mack." Whatever the future may bring, you'll find that for a sound investment in long-term reliability and operating economy there's no other truck to match a Mack.

Your nearest Mack branch or distributor will give you the full story on what "Built Like A Mack" means in *extra* long life, *extra* strength and stamina, *extra* performance and *extra* dependability.

In punishing contracting service Mack trucks "see you through" with long-lasting dependable operation. This Model LJ six-wheel Diesel Mack serves D'Addario Contracting Co. of Bridgeport, Conn.



...outlast them all

Mack Trucks, Empire State Building, New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

B.F. Goodrich



These tires carry 95 tons over crushed limestone—with ease!

HAULING heavy loads over jagged rock in all kinds of weather calls for tires that can really "take it." Yet this is an everyday occurrence for these B. F. Goodrich Rock tires. The BFG's shown here are used on vehicles that haul limestone and shale from quarry to plant. The total load is 190,000 lbs., of which 88,000 lbs. is pay load.

B. F. Goodrich tires can give this kind of service because they are built to stand up under the most hazardous quarry and construction hauling conditions. For added protection, the pat-

ented *nylon shock shield* is built into all B. F. Goodrich tires of 8 or more plies. Extra strong, elastic nylon cords are placed between the tread rubber and the cord body. Under impact, these cords work together, absorbing and distributing the shock evenly. The shock shield protects against bruises and means more recappable tires as well as longer service. Here is a construction advantage which is found only in BFG tires—and at *no additional cost*.

B. F. Goodrich tires are also available in all-nylon construction. For these or

any off-the-road tires see your BFG dealer. Or write for additional information on these tires that do a better job at lower cost. *The B. F. Goodrich Company, Akron, Ohio.*





SLOW MEN WORKING

Are you satisfied with your present hand labor costs? If you're like most construction men, your answer is probably an emphatic "NO"!

Hand labor is expensive—because it's slow.

But that's *not* the situation when you put a Gradall on the job!

The operator works with large tools, quickly changed for each particular job. He moves large quantities of earth rapidly, with such precision that clean-up hand labor is practically eliminated.

And the Gradall works in "tight" places inaccessible to other machines. Mounted on a 360° turntable, its telescoping boom "reaches out", twists and turns like an arm, to do its work in confining areas not much larger than the Gradall itself. And it's always "ready to go"—ready immediately to be driven to the next job at truck speed.

Cut your construction costs on many jobs, such as trenching, excavating, ditching, backfilling, grading, and pavement removal. Arrange a field demonstration with your Gradall Distributor today.

**Gradall Distributors in over 60 principal cities
in the United States and Canada**



**WARNER
&
SWASEY**
Cleveland

GRADALL—THE MULTI-PURPOSE CONSTRUCTION MACHINE

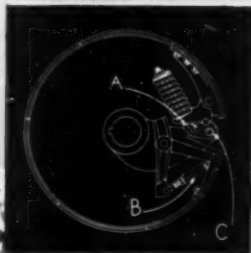
ELIMINATE THE SHOCK OVERLOADS

**NORTHWEST
ADVANTAGES
MEAN LOWER
OPERATING COSTS**

**BEFORE THE
DAMAGE
IS DONE!**

Protective devices at this point (between the engine and operating machinery) act after the shock load has passed through shafting and gearing. The Northwest Cushion Clutch catches the overload caused by the inertia stored in the rotating parts ahead of the engine.

The Cushion Clutch is a simple, positive device. The joint at "A" remains closed until overload point is reached. An overload causes the joint to open through the driving pin "C" and the clutch slips enough to cushion the shock of the load. The clutch is adjusted by the turnbuckle "B". There is no other adjustment.



● THE Northwest Cushion Clutch in the Main Drum Clutch eliminates *shock overloads before the* overload reaches the machinery, not *after* they have been carried through the machinery with resulting strain and possible damage.

The Northwest Cushion Clutch reduces overloads on the drum shaft and associated parts. It results in reduced frequency of adjustments. It lengthens machine life and puts money in your pocket by reducing wear and tear.

NORTHWEST ENGINEERING COMPANY
1504 Field Building, 135 South LaSalle Street
Chicago 3, Illinois



Your Northwest is a real Rock Shovel and if you have a real Rock Shovel you never have to worry about output in any other kind of digging.

NORTHWEST

CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS



Grand Champ

**Carroll Brown's big red TD-24 wins out on Colorado's
"toughest road construction job ever!"**

This summer, tourists welcomed the new wonder highway to the gleaming trout lakes atop Grand Mesa. But the men who built it called it "The Snake Pit"—a two-mile-high inferno of falling rocks, dynamite-proof basalt, and even prehistoric ice on the high north slopes where the sun never shines.

They had to clear out 300,000 cubic yards of snow before they could start building. They could work only from June to October each year—and they had to make a two-hour trip to the job each day because the air on Grand Mesa was so thin men couldn't stay at the job site.

It took five years and a million dollars to build six miles of highway—nearly a year and two hundred thousand dollars a mile. Carroll Brown, of the Brown Construction Company, finally finished

the job with flying colors, and he came up with this conclusion:

"On this most difficult project our company ever tackled, under the severest conditions we ever encountered, the International TD-24 tractor definitely outperformed all competitive equipment."

Once again the big red crawler had proved itself the Champ. The Champ for tough, dogged, never-give-up guts—148 maximum horsepower at the drawbar, 8 speeds forward, 8 reverse, Planet Power Steering with finger-tip control.

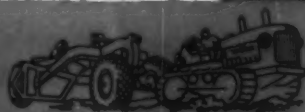
Ask your International Industrial Distributor for the real low-down on the TD-24. It's backed by complete parts supplies and service facilities for the hard-working years ahead. Get the whole story. You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS



INTERNATIONAL

**POWER
THAT PAYS**



of Grand Mesa

TWO MILES HIGH on Grand Mesa, an International TD-24 dozes more rock with more speed on new million-dollar highway. Volcanic rock, dense-grained basalt proved a pushover for the big red Champ.

GRAND MESA
2 MILES

DENVER
1 MILE



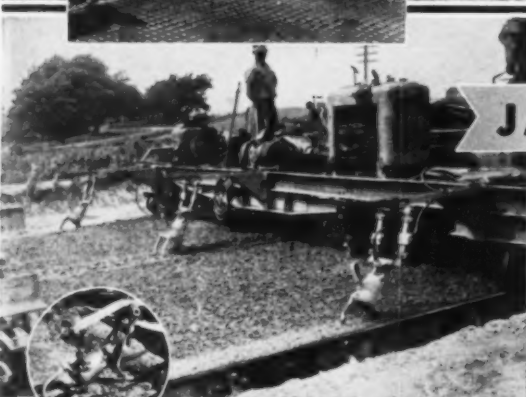
FOR LARGER PROFITS and BETTER RESULTS IN EVERY PHASE OF CONCRETE PAVING!



HIGHWAY and AIRPORT

JACKSON VIBRATORY PAVING TUBE

The JACKSON Paving Tube, which is quickly attached to any standard finisher, provides full width internal vibration through full depth of the slab. The harsher mixes are readily made plastic. Important savings in cement can be made, or important gains in compressive strength and durability achieved when no cement reduction is made. Spreading costs are reduced, finishing progress is much more rapid, complete compaction is accomplished and concrete is perfectly puddled at side-forms and joints. It is adaptable to slabs 6" to 24" thick and quickly adjustable from 10' to 25' widths, in the field. May also be attached to standard spreaders for vibrating the first course in thick slab construction. Write for complete details.



JACKSON SIDE FORM VIBRATOR

Eliminates manual vibrating of concrete at side forms. Saves the better part of two men's labor. Mounts on any modern finisher, Jackson Vibratory Paving Tube or Spreader. Employs two or more vibratory units which are simultaneously lowered into or raised from the concrete by the finisher operator. Units operate close to forms or reinforcement, ride over any obstruction without fouling. Will not penetrate into sub-base. Assures thorough compaction regardless of speed of finisher, no spots missed. Long-wearing, trouble-free. Write for complete facts.

**MUNICIPAL PAVING - BRIDGE DECKS
HIGHWAY WIDENING and PATCHING, etc.**



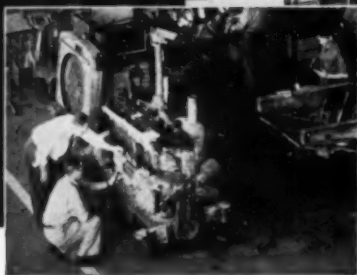
JACKSON VIBRATORY SCREED

Strikes off to any crown, undercuts at curb or side-form, works right up to and around manholes and other obstructions. With it center joints may be eliminated and full widths (up to 30') poured. Requires only two men on widest slab, due to strong tendency to propel itself. It's the only screed that can be rolled back on 4 rollers for second pass. Contractor has only to secure plank cut to proper length and crown to be set for any job. Powered by Jackson 1.25 KVA Portable Power Plant. Most productive, most versatile of all screeds. Write for details.

**VIBRATORS for every type of concrete
construction FOR SALE or RENT at your
Jackson Distributor.**

**ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON - - - MICH.**

Your strong right arm... in time of need



BECAUSE of the vast defense mobilization program, material shortages and extra production demands have gripped the nation. They affect particularly the heavy industries and the distributors and users of their products. And huge as America's facilities have become in recent years, they still are not large enough to keep pace with both military and civilian needs.

Nevertheless, as an owner of "Caterpillar" products, you are among the more fortunate. Your "Cat" equipment has been built for long life and to withstand severe working conditions. What's more, it is backed by a dealer organization that is world-famous for experience, accessibility, mechanical facilities and field service to keep you going "come hell or high water."

Since World War II, the already large number of "Caterpillar" sales-and-service establishments has increased greatly. Also since that time, "Caterpillar" and its dealers have developed new techniques for restoring and extending the life of "Caterpillar" products. Today, in their own shops, "Caterpillar" dealers can *rebuild* a great many worn or damaged parts which formerly required completely new replacement. In short, every dealer is richly acquainted with scores of modern ways and means for

keeping your machines in good working condition. You can help by doing this:

Take your maintenance problems to your "Caterpillar" dealer BEFORE parts are worn beyond repair

Remember that excessively worn parts can cause damage to mating parts; that track parts, pistons and liners, crankshafts, cylinder heads, radiators and other items usually can be salvaged. Your problems are your dealer's problems. Go see him today. He'll do everything in his power to keep your machines operating. Your combined efforts will be reflected in longer equipment life.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES

TRACTORS

MOTOR GRADERS

EARTHMOVING EQUIPMENT

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... measure by



"KOEHRING WORK CAPACITY"

**Ask your Koehring
Distributor for
specific information**



7 $\frac{3}{4}$ to 79 $\frac{1}{2}$ TONS lift capacity . . . $\frac{1}{4}$ to 2 $\frac{1}{4}$ yards dipper capacity

When writing advertisers please mention ROADS AND STREETS, July, 1951

Here's Why **CHARLES**



**See your Le Tourneau Distributor
NOW for complete information**

FRYSINGER bought 3 More D TOURNAPULLS



C. W. Frysinger, Columbus, Ohio contractor, bought a high-speed, rubber-tired D Roadster Tournapull especially for finishing sub-grade, berms and back-slopes on a 10-mile, 178,000-yd. stretch of U. S. Hwy. 30N in Crawford and Wyandot Counties. Put to work self-loading around poles and culverts, the versatile Roadster averaged 50 pay yards of topsoil, sand and silt hourly on 1200' one-way hauls through traffic. "It did a first rate job on this assignment," reports Mr. Frysinger.

"In 2005 hours ... 96% efficient

"We purchased our second D Roadster early in 1950, because again we had a lot of berm work," continues the Ohio contractor, who just bought his 3rd and 4th "D's" this spring. "The machines fit right into our program. Our first Tournapull now has 2005 hours on it and is 96% mechanically efficient."

At present, the "D's" are being used by Frysinger Construction Company to handle fine-grading, sloping, and berm construction on 6 miles of State Hwy. 18 between Tiffin and Republic, Ohio. The entire stretch is being widened 6 ft., drain-

age improved, and bad curves corrected. Approximately 58,000 cubic yards are involved. Hauls vary from 300 to 2000 ft. one-way. Here's typical performance:

On 1000' haul . . . 54 yds. hourly per unit

Self-loading in topsoil and clay, each 122 h.p. Roadster heaps 4½ pay yards in 45 to 60 seconds. Loading distance in shallow roadside cuts ranges from 75 to 85 ft. Haul, dump and return on a 2000-ft. cycle through traffic takes only 3½ minutes. Making a round trip every 4½ minutes, each Tournapull delivers 12 loads . . . 54 pay yards an hour.

Average 25 m.p.h. job-to-job

Frysinger takes additional advantage of the rubber-tired "D's" speed and mobility by driving his rigs over main highways from job to job. Two Tournapulls made the 90-mile trip from Columbus to their present job at Tiffin in 3½ hours.

You'll find this versatile, 7-yd. (9-ton) D Roadster a time and money-saver on all your dirtmoving jobs, too . . . either as a self-loading, odd-job tool, or in fleet operation with a pusher. Ask your Le-Tourneau Distributor for job-proved facts and figures. Call him, or write TODAY.

VERSATILITY for extra profits

In addition to 7-yd. Garrett Scraper, and front-mounted Bulldozer blade, D Tournapull prime mover also powers interchangeable pulls shown below:



7-yd. Garrett
TOURNAROCKER



10-ton Rub-bed
TOURNAHAULER



7-ton hoist
TOURNACRANE



V-type
SNOW PLOW

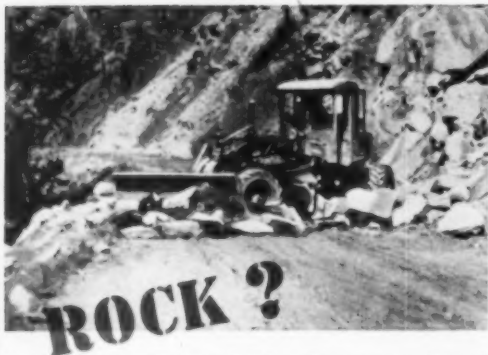
LETOURNEAU
PEORIA, ILLINOIS



TOURNAPULLS

FOR LOWEST NET COST PER YARD

what's **YOUR** headache.



ROCK ?

On an A-W Power Grader the bulldozer becomes a rough, tough tool . . . extra sturdy to match the extra power of ALL-WHEEL DRIVE, and fully up to this job of clearing a rock slide.



SAND ?

Live, climbing power at both ends of the machine keeps it bulldozing steadily through sand where an ordinary grader would find it difficult to travel, let alone work.



EARTH ?

On this railroad fill, there is plenty of power and traction to use both blades, with their fingertip hydraulic controls for quick and easy, precision operation.



TREES ?

First, the grader blade with its deep-plowing ability is socked into the ground to undercut the tree roots; then the bulldozer backed by the superpower of ALL-WHEEL DRIVE finishes the job.

The traction and maneuverability of A-W Power Graders make them ideal tools for the Bulldozing jobs found on grading and construction work. Heavily made and reinforced to accommodate the extra power of All-Wheel Drive and Steer, the Bulldozer is an essential for many jobs—a time and money-saver for dozens of others.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

Subsidiary of Baldwin-Lima-Hamilton Corporation



More Miles Per Day— More Miles in the Life of Your Trucks

Trucks with Eaton 2-Speed Axles "make time", not only on the open highway, but in city traffic as well. Even more important, Eaton 2-Speed Axles save wear-and-tear on engine and power transmitting parts; keep trucks in service, and add thousands of miles to vehicle life. Many exclusive features com-

bine to give Eaton axles long life with minimum maintenance cost. Planetary gears distribute loads over several gear teeth, dividing the stress. Positive lubrication, even at slow speeds, reduces friction wear. Ask your truck dealer to explain how Eaton 2-Speed Axles pay for themselves over and over.

EATON *2-Speed Truck* AXLES



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



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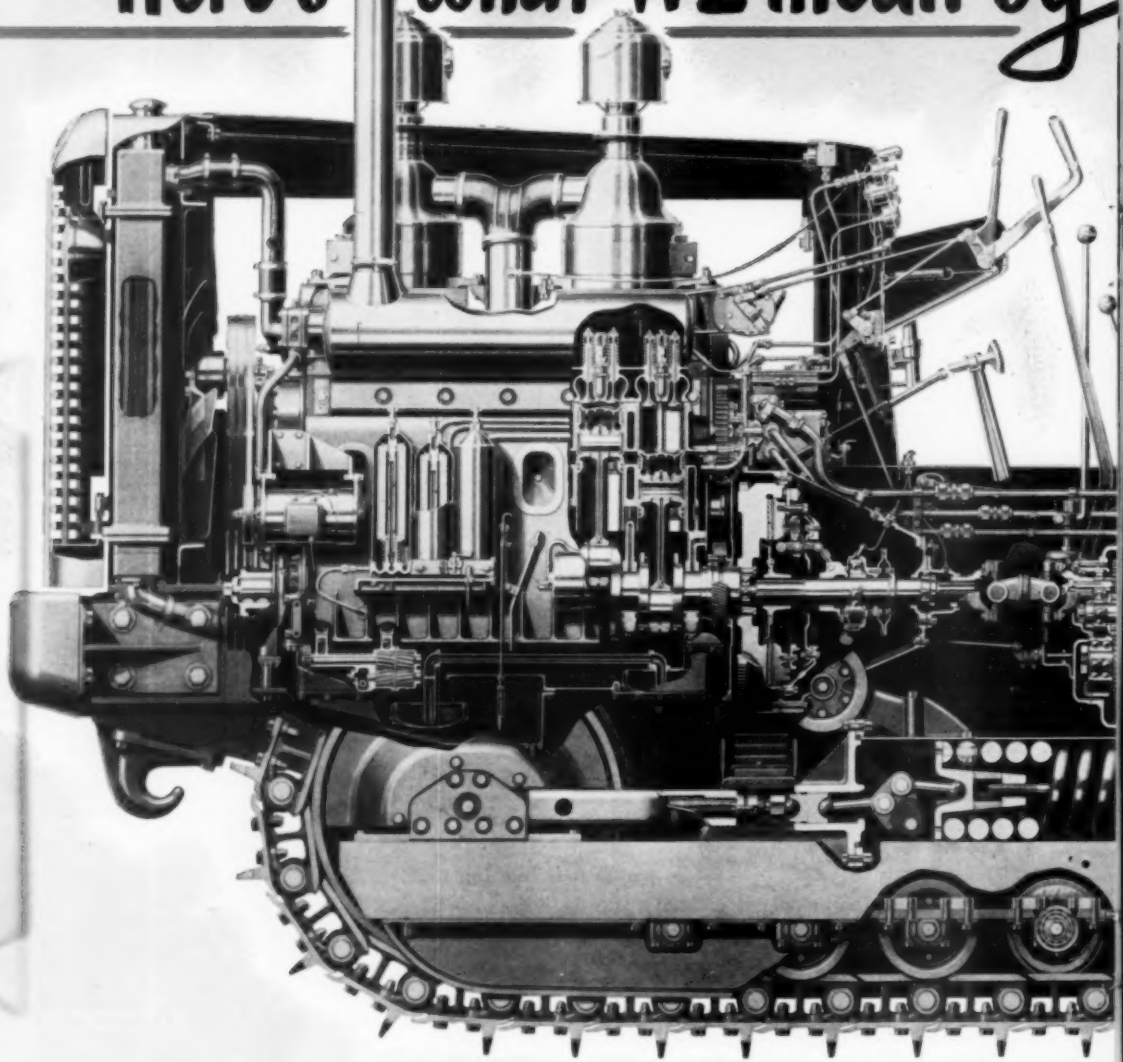
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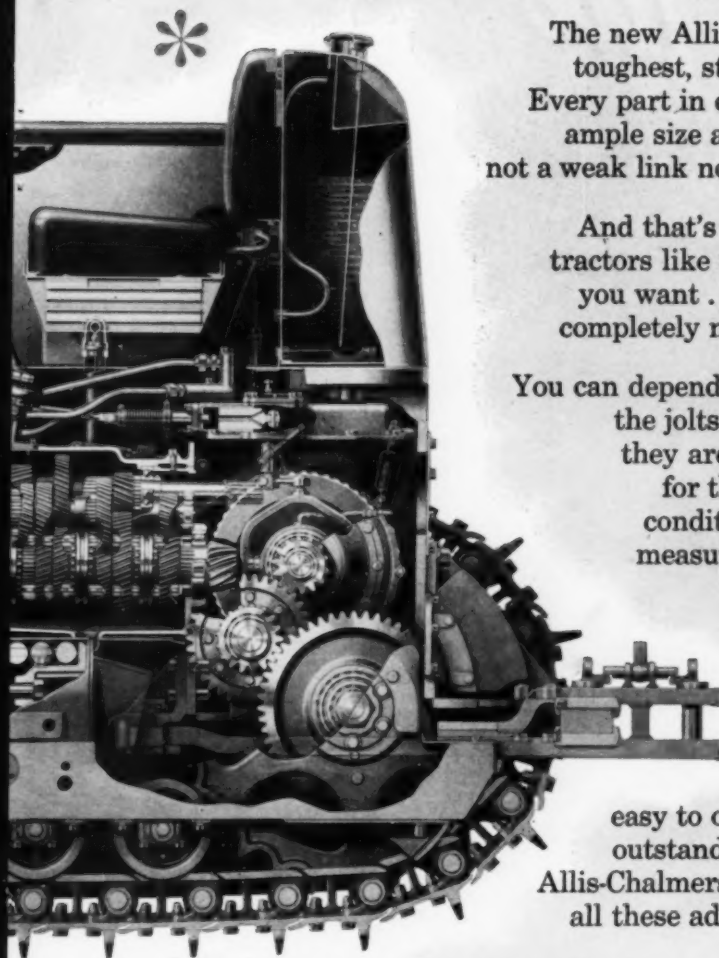


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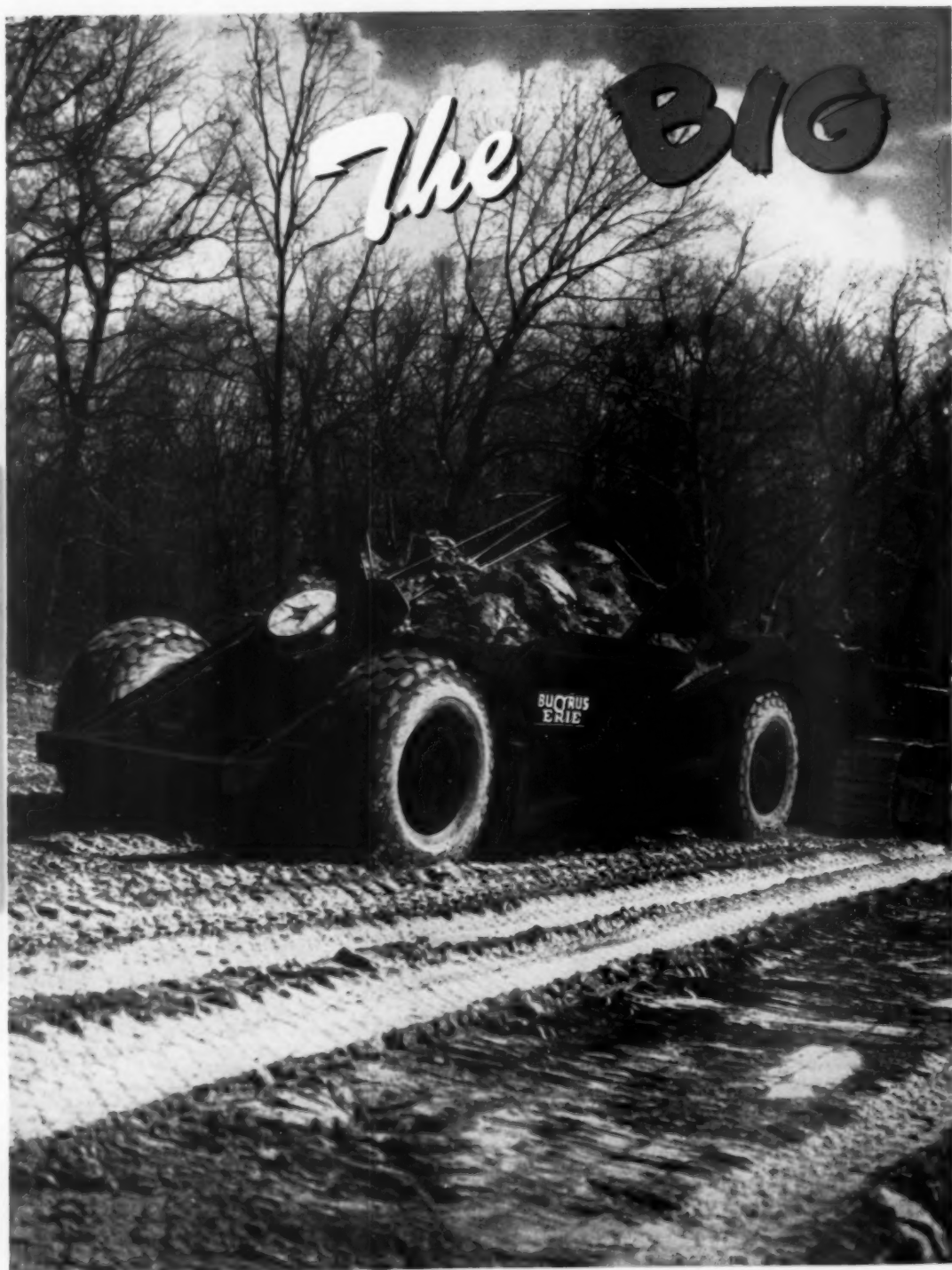
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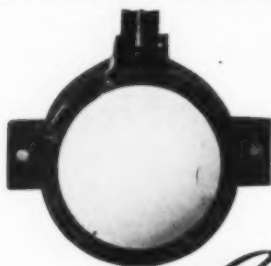


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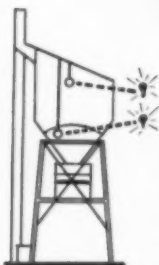
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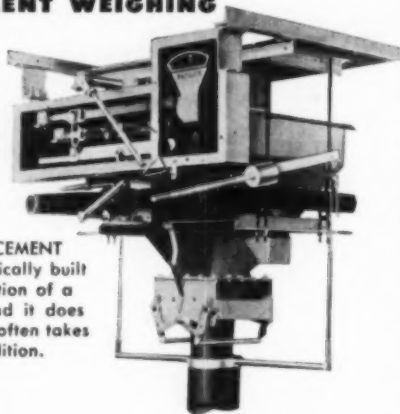


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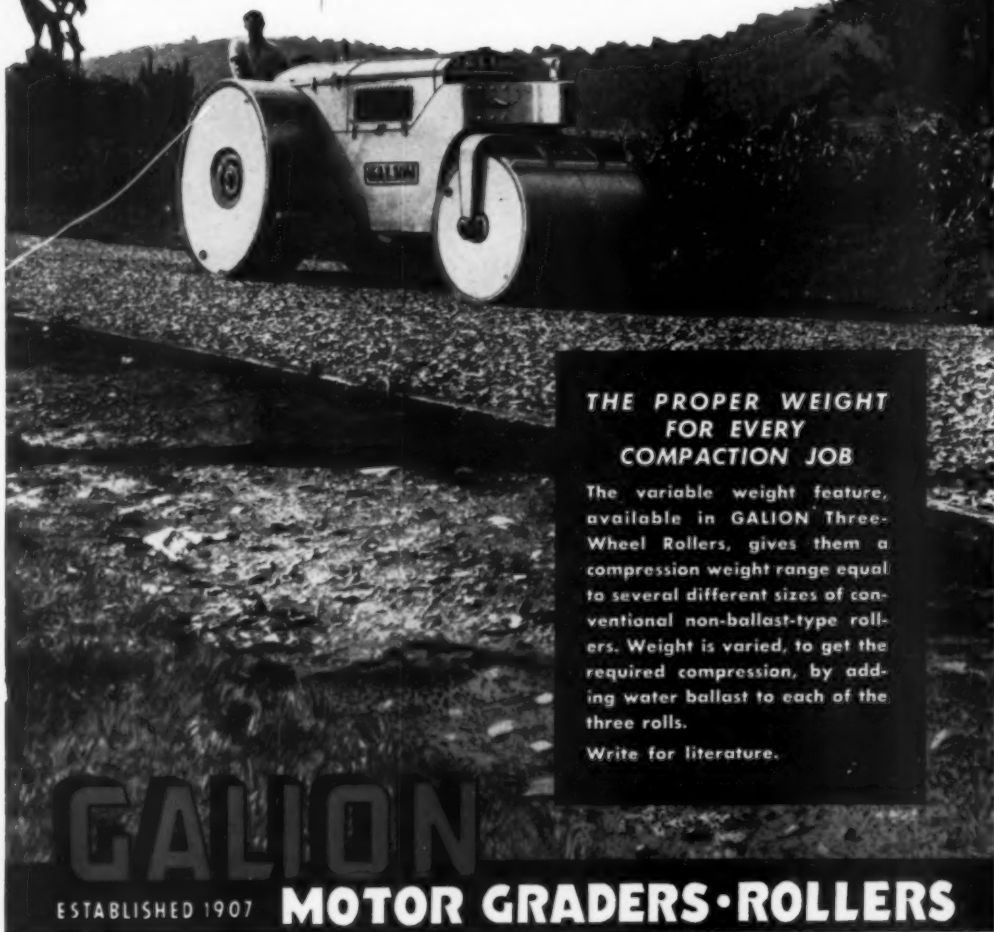
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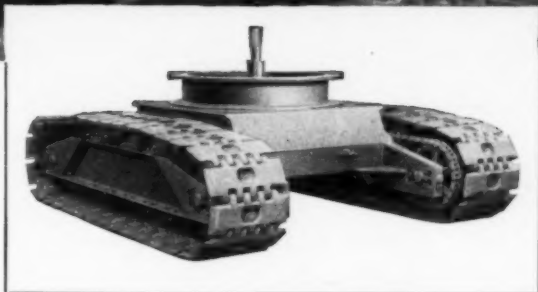
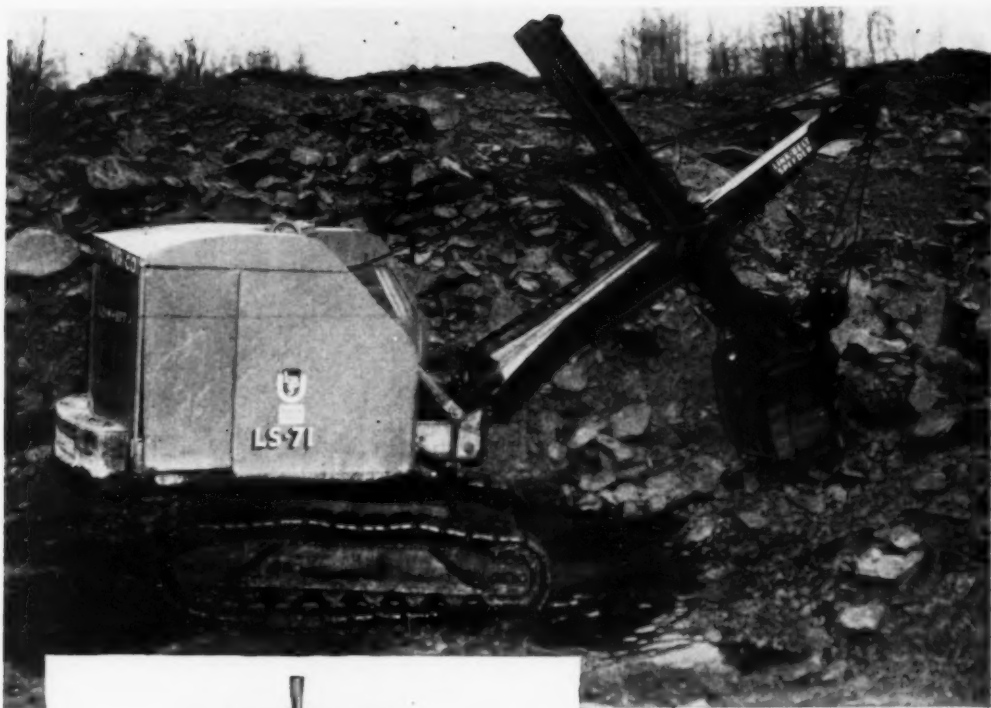
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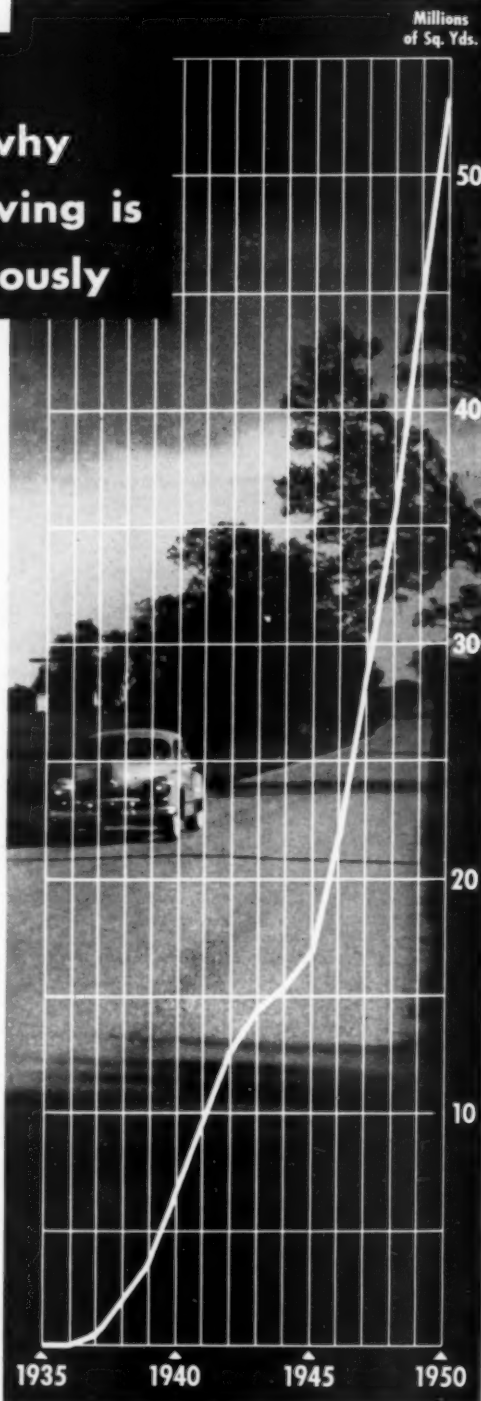
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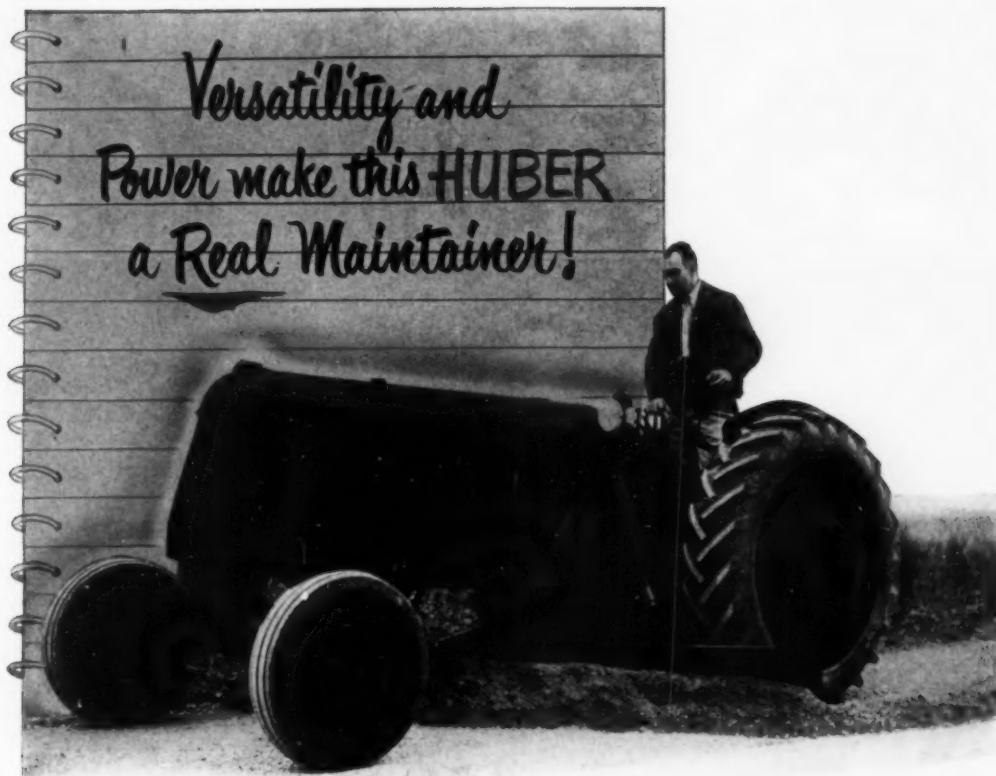
*Soil-cement pavement consists of a soil-cement base and a bituminous surface.

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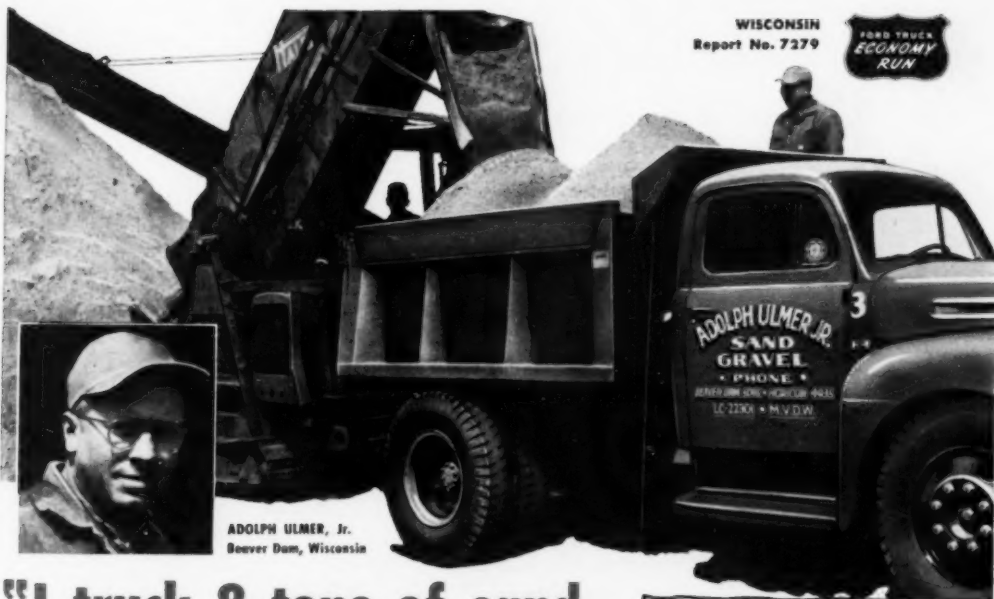
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Scrapers Mingle with City Traffic

in 650,000 Yd. Road Raising and Hill Job at Cincinnati

Double-shift earthmoving schedule, with time out for rush-hour traffic, employed by contractors on Beechmont Avenue Extension project. New high-level flood levee to carry SR 74 & 125 and suburban traffic past Lunken airport

SCRAPERS carrying reduced loads mingled with traffic this summer along a section of SR 74 and 125 near Cincinnati's eastern edge. Working under a special permit from the city, the contractor is transporting 650,000 cu. yd. of earth across a city-owned viaduct for construction of a new high-level levee skirting the Ohio river bottomlands at Lunken airport.

This operation and an additional 200,000 cu. yd. of earthmoving is to be done without shutting down traffic at any time under contract terms which required approval of a traffic maintenance scheme as one of the pay items.

The project is the Beechmont Avenue extension, one of the largest current projects of the Ohio department of highways. Under a \$2,100,000 contract awarded in 1950 to Vest & Bartell, general contractors of Cincinnati, a 1½-mile relocation of SR 74 and 125 will be built and this main highway to Mt. Washington and other eastern suburbs will be tied into Linwood Avenue at the city end. The job also involves a major bridge over the Little Miami River, and two interchanges.

New High Levee

The main roadway which will consist of a 4-lane divided concrete pavement will be carried on a new earth

levee for most of the length of the project. The new roadway will be approximately 7 ft. higher than the old, this raise being found necessary to top extreme floods of the Ohio River. The new levee will partially or completely envelop the old levee, as shown on the cross-section sketches, the new line gradually diverging from the old. Traffic will be maintained on all or part of the old roadway during the first phase of the levee construction, wherein the eastbound side of the new roadway will be completed and opened to traffic. As phase 2, the old roadway will be abandoned and the new E. B. roadway used for 2-way traffic while the remainder of the levee is completed and the new west-

bound pavement placed.

The new levee totaling nearly one mile in length is being filled entirely from a hill at the city-ward end of the job. Haul including crossing of an intervening railway grade separation viaduct, will average about 0.6 mile. The hill cut mostly in blue or yellow clay will have a maximum depth of 87 ft. Earthmoving has been sublet to J. H. Turpin Co., of Cincinnati.

The first part of the hill removal was accomplished entirely with self-propelled scrapers and a heavy push loader. Under a special permit from the city, these heavy off-road machines used the viaduct and the adjacent concrete paved 4-lane roadway of Beechmont Avenue as part of the haul road to the levee filling operation. A limit of 34,000 lb. gross load per front or rear axle was prescribed, under which the contractor computed the permissible payload for each ma-

★ In the midst of 15,000-a-day urban arterial traffic, note Caterpillar DW10 tractor with No. 10 scraper heading for the hill for another load. Sprinkler truck glimpsed at extreme left





★ Looking along the old levee-top roadway (right) and grading for new wider, higher levee roadway (left). Heil scraper bringing load from the 650,000 yd.-hill (seen in background)

chine used and the approximate level each operator was to load his pan to avoid overload. Payloads ranged from 9 to 12 cu. yd. loose measure for the various units.

Traffic Control Problem

Equipment employed during the early stage included one TD24 International push tractor, two Caterpillar No. 10 scrapers with DW 10 tractors, one "special" consisting of a LaPlant-Choate scraper drawn by a Caterpillar DW 10, and one Heiliner 500 self-propelled scraper. This limited fleet moved about 2500 cu. yd. per day (2 shifts) on 4000 ft. average haul, working under flag control.

Traffic control during this hauling was seen to be a major problem, since the count along this section of SR 74 and 125 averages about 15,000 vehicles daily. No hauling was to be allowed between 6 and 9 A.M. and 4 and 7 P.M. rush periods. Since this would mean a very short working day, the sub-contractor elected to work two shifts, his second shift being from 7 P.M. to 5 A.M.

After about 100,000 cu. yd. had been removed by the scrapers the contractor brought in a P&H 2½-yd. shovel and 6 to 8 large dump trucks, with the expectation of bringing production to about 8,000 cu. yd. per day to complete the hill cut.

A problem in connection with hauling over the street viaduct was that of keeping the pavement reasonably clean. Despite the under loading of pans, some spillage inevitably occurred and also some dirt dropped from tires and other parts of the

equipment. In order to control dust the contractor provided a gravity sprinkler truck which made frequent round trips over the haul route. As mud accumulated a slipperiness problem also developed, and the city of Cincinnati cooperated by providing street flusher service at intervals, with occasional use of a fire hose at the intersection where the scrapers left the cut. Later in the job the contractor expects to add a pump to his sprinkler and take over most or all flushing required along the job.

Additional equipment on hand as of

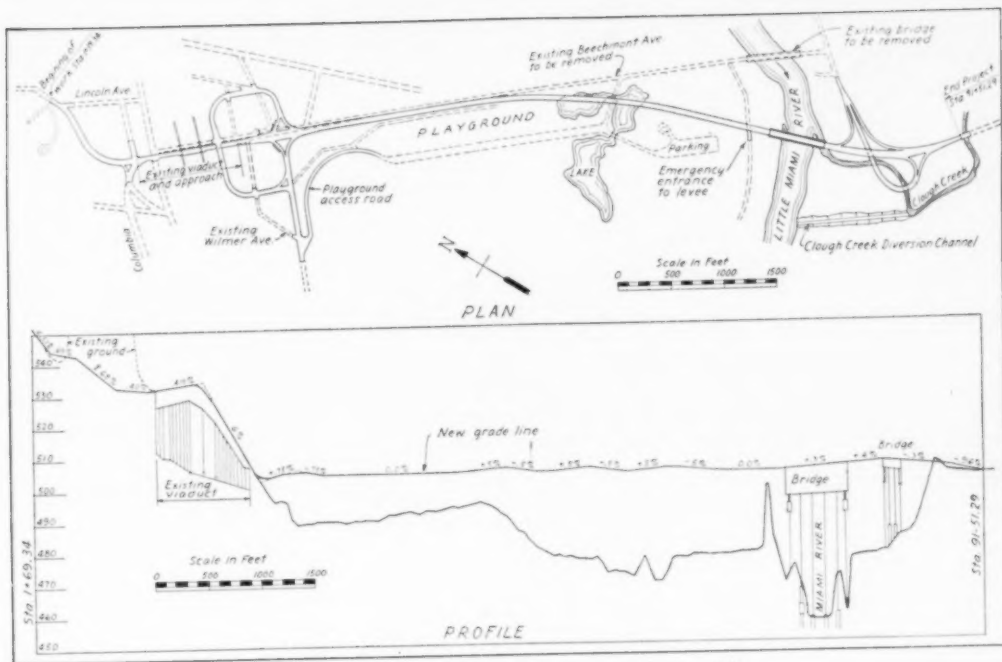
June 8 for levee compaction, interchange grading, channel changes and bridge foundation excavation included:

- 1 Galion motor grader
- 2 Bucyrus-Erie B-170 scrapers (12 yd.)
- 3 International TD24 tractors with Bucyrus-Erie dozers
- 3 Heil 500 self-propelled scrapers
- 1 International TD24 with Bros double-drum (4-ft.) sheepsfoot roller unit
- 2 Caterpillar D7 tractors with double-drum (3-ft.) units
- 1 P & H 655B crane for driving bridge pier sheeting

An interesting minor problem en-



★ A creek channel change being excavated, as part of the relocation project. Equipment here: Bucyrus-Erie B-170 scraper, TD24 International tractors



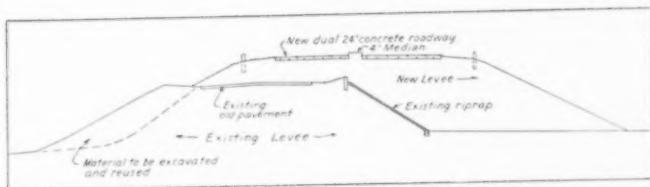
★ General plan and profile of Beechmont Avenue Extension, showing features referred to in article

countered on the levee filling is that of draining and filling in several large ponds in the low ground adjacent. After borings showed the existence of gravel under the mud, these ponds were "punched out," i.e., holes are drilled into the gravel in an effort to bring about partial or complete subsidence by the time filling in is scheduled later in the summer. While draining the ponds would require no great pump capacity, doing so gradually in this manner offered a chance to dry the mud and thus avoid having to dragline excessively wet material.

The Beechmont Avenue project



★ This sign is standard along Ohio state road projects. An effective appeal



★ Typical cross-section of old flood levee and new. Ohio specifications require special quality construction for embankments subject to inundation or exceeding 10 ft. in height.

when completed in 1952 will give S.R. 74 and 125 traffic a streamlined roadway above all likely floods, and serve as a link in the federal-state-city-county expressway program for the Cincinnati area. The Ohio department of highways, T. J. Kauer, director, is represented on the job by Marc Korb, project engineer, with Prosper Russo, district construction engineer, and J. S. Paxton, division engineer of district No. 8 at Middletown.

New Lubricant Developed By Armed Forces

A new grease that performs equally as well in tropic heat or Arctic cold has been adopted for use on all Army vehicles and artillery pieces. The Department of the Army said the all-temperature lubricant developed by the Army Ordnance Corps is expected

to simplify the Army's supply problem by replacing at least six different greases. Extensive tests over the past three years started with "Operation Greaseball." It involved a convoy of 12 Army trucks that left Aberdeen Proving Ground in 1948 and covered 20,000 miles of driving in varying climates.

Week-End Truck Ban Issued in Wisconsin

The Public Service Commission of Wisconsin again has issued an order to prohibit trucks over 8,000 lbs. gross weight from using principal highways during weekends for the period from May 29 until the second Sunday in September. Trucks are denied the use of these roads between the hours of 1 p.m. and 10 p.m. on Saturdays and 9 a.m. and 10 p.m. on Sundays or legal holidays.

LEGAL SPEEDS (EXCEPT IN ZONED AREAS)	
AUTOMOBILES (DAY)	60
AUTOMOBILES (NIGHT)	55
BUSES & TAXIS	55
COMMERCIAL VEHICLES	45
PLEASE DRIVE CAREFULLY	

★Informational signs are located at strategic points, giving legal speeds for different types of vehicles

How all branches of the organization cooperate to do a unified job of building greater safety into Texas roads

By Fred T. Bennett

Engineer, Traffic Services, Texas Highway Department, Austin

THE Traffic Safety Program of the Texas Highway Department is an integrated one that extends from the top administrative level to the hourly employee in the field. It is a program based on sound, proved engineering principles, most of which are incorporated in the Action Program of the President's Highway Traffic Safety Conference of 1946 and the Texas Governor's Highway Traffic Safety Conference of 1947, and no claims can be made for new or startling innovations. The program can, however, claim the basic requisites of organization, coordination, planning, execution, and cooperation with other agencies concerned with the broad problem of automotive transportation.

It is fundamental that no program great or small can achieve any great degree of success without the coordinated efforts of an efficient, smooth functioning organization, and therefore it might be well to review the organizational plan which put the Traffic Safety Program into effect. For sake of brevity, only those units

having directly assigned responsibilities will be included, although the credit for any worthwhile accomplishment rightfully belongs to the entire organization.

Administration

The Texas Highway Department operates on a highly decentralized basis, primarily because the great area of the State makes this type of operation desirable for maximum efficiency. The skeleton or framework of the Department from a physical standpoint consists of the headquarters or Main Office at Austin, 25 District Offices including their resident offices at various points within the State, and Urban Project Offices in the four largest cities—Houston, Dallas, San Antonio, and Fort Worth.

The administrative control of all programs is vested in the State Highway Commission and the State Highway Engineer. It is from this level that the impetus for the Traffic Safety Program stems, for both the State Highway Commission and the State Highway Engineer have expressed conviction that the users of Texas highways are entitled not only to the best in highway design and construction but to efficient operation of the

Integration is Key to

Texas Traffic Safety Program

highway system that will enable motorists to travel with a feeling of safety and convenience and a minimum of irritating delays.

Planning and Coordination

With the impetus gained from the top administrative level, the program moves into the planning stage of a two-pronged attack; namely, (1) new facilities which incorporate all the design principles of safety, and (2) making better use of existing facilities. The planning for the program of new facilities is primarily the joint responsibility of the Districts and the Road Design, Bridge, Land Service Roads, and Highway Planning Survey Divisions of the Austin Office, coordinated by the Chief Engineer of Planning. The planning for the program directed toward making better use of existing facilities is primarily the joint responsibility of the Districts and the Traffic Services and Maintenance Divisions of the Austin Office, coordinated by the Chief Engineer of Construction and Maintenance. When the final stages of planning are reached, the programs are of course returned to the Highway Commission and the Highway Engineer for final approval and allotment of funds.

Execution of Program

The final approval having been gained and the necessary funds provided for the programs, the way is

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★(Left): Raised stripe consisting of asphalt seal coat with aggregate cover, placed on 2-lane pavement. Special machine used to build this economical stripe, developed and long used by the Texas highway department. (Right): Texas striping scheme for 4-lane pavement



then clear for putting them into effect. Design and preparation of plans for new highways are done in the District Offices, except for the expressway projects in the four largest cities. These expressway projects have their own engineering staffs. Close liaison is maintained with the District Offices by the Road Design, Bridge, and Land Service Roads Divisions through Senior Designing Engineers who make regular visits to the Districts for consultation on design problems. In the construction stage, the engineering supervision and inspection are handled by Resident Engineers and their assistants under the supervision of the District Engineers.

In the program of making better use of existing facilities, the activi-

ties are centered principally on the application of traffic control devices such as signs, signals, pavement markings, and channelization; on regulations such as speed zoning, marking curves with safe speed indications, parking restrictions and prohibitions, and one way operations; on investigations of high accident locations; and on rendering assistance to the smaller cities and towns with their individual



★Speed limit signs at limits of incorporated cities. Note ample size



★Curve warning signs with safe speed indications

traffic problems. The engineering design of these measures is the responsibility of the Traffic Engineering Section of the Division of Traffic Services, and most of the designs follow nationally approved standards. The actual work of applying these measures is carried out by the District Maintenance personnel. On municipal problems, the Division of Traffic Services furnishes the supervisory personnel for the studies, and



★(Above): Rural speed zone sign.
(Below): Urban speed zoning

the Districts and municipalities themselves furnish the personnel for collecting the survey data.

Program Accomplishments

Some of the major accomplishments of this two pronged program for the year 1949 which won third place for Texas in Engineering accomplishments in competition with the seven other largest States—California, New York, Michigan, Ohio, Pennsylvania, Illinois, and Indiana—are as follows:

1. **New Facilities.** The year's efforts produced these results in new facilities: (A) 2,204 miles of highways, 2,112 of which were 2-lane, 15 3-lane, 57 4-lane undivided, 13 4-lane divided, and 7 controlled-access express high-



★Typical intersection assembly—designed to eliminate the confusion common with grouped signs



★Over-size directional route marker and destination signs



★ "Before" and "After" changing from angle parking to parallel parking along an urban section of a Texas arterial route. Helps move more traffic more safely

ways; and (B) 70 new bridges. Closely allied improvements involving capital expenditures included 587 miles of existing highways resurfaced and 225 miles of highways widened.

2. Making Better Use of Existing Facilities. The efforts directed toward making better use of existing facilities resulted in these accomplishments: (1) 5,790 miles of pavement marked with center lines and 7,035 miles of pavement marked with barrier stripes for no-passing zones; (2) curves good for speeds of 50 mph. and less marked with safe speed in-



★ Channelization of intersections is an important part of the Texas safety program



★ Stop sign installed swung overhead at intersection, as auxiliary to signs located at usual shoulder positions. (Lower scene) Reflectorized signs defining edge

dications on 15,600 miles of highways; (3) 20,450 new traffic signs added and 69,600 existing signs replaced with new or reconditioned signs; (4) 591 studies made to determine need for traffic signals; (5) 15 fixed-time signals and 43 flashing beacon installations completed; (6) 20 miles of speed zones established; (7) 54 railroad-highway grade crossings protected with signals or gates; (8) 36 inter-sections channelized; (9) 414 problem locations improved; (10) 264 special traffic studies in municipalities.

Cooperation With Other Agencies

In spite of what might be considered a satisfactory degree of success within the realm of its legally delegated responsibilities, no Department can hope to realize the maximum achievement from its efforts without the fullest cooperation with other agencies, both public and quasi-public, when they too have a stake in the problem. The Highway Department is fully aware of this truth, and it works hand in hand with such agencies as the Texas Department of Public Safety, the Texas Department of Education, and the Texas

(Continued on page 92)

Michigan Overhauls Its Road Legislation Why Can't Your State?

The 23rd of May, 1951, marked a signal victory for highway progress in Michigan. On that day the Michigan Good Roads Federation program was enacted by the Legislature over the Governor's veto. The following summary, as described by Lawrence A. Rubin, Executive Director, Michigan Good Roads Federation, should make absorbing reading in other states—where unfortunately the legislatures have failed to agree on various road proposals, this year or last, while highways continue to deteriorate for lack of adequate funds, proper fund distribution, and modern administrative machinery.

IN 1946 the Michigan Good Roads Federation, comprised of highway users, administrators, builders and materials and supply men, became greatly alarmed over the obvious deterioration of the state's overall road and street plant. Rather than propose arbitrary increases in road revenues to take care of the disrepair accentuated by heavy war production traffic, the Federation directors decided to make an engineering analysis of deficiencies. They were determined to find out the extent of road needs, the cost of meeting them, a reasonable length of time for doing so. They decided to evaluate other pertinent factors such as highway administration, classification, financing and revenue distribution among the various road and street agencies.

"Needs Study" Organized

To make this engineering analysis, the Federation selected J. P. Buckley, now Chief Engineer, Highways Division, Automotive Safety Foundation, who was then completing a similar analysis for the State of California. Mr. Buckley, benefiting from his previous experience, organized Michigan's "Highway Needs" study. The Federation appointed six of its directors to comprise the Highway Study Committee. They represented the Michigan trucking industry, the Automobile Club of Michigan, state high-

way department, county road commissions, municipalities and the road building industry. These six men were responsible for the determination of policy in connection with Mr. Buckley's engineering efforts. Step by step, paragraph by paragraph, chapter by chapter, the Highway Study Committee passed upon and approved Mr. Buckley's work.

The State Legislature recognized the Federation's efforts and by resolution appointed a joint committee to counsel, advise and participate in the deliberations of the Highway Study Committee. Finally, in February of 1948, the report "Highway Needs in Michigan" was published.

Immediately the recommendations were boiled down to legislative proposals and finally into actual bills ready for introduction in the Legislature.

Originally the Federation's recommendations made it mandatory that state collected funds returned to road and street agencies for expenditure on local roads and streets be matched by those units of government. How-

ever, this mandatory matching requirement was eliminated. But the principle and intent of the Legislature was retained in that only limited state collected funds can be spent on "local" roads and streets. Any additional moneys therefor will have to be raised by the unit of government benefiting therefrom.

The Federation proposed that county road commissions confine themselves to matters of policy making and that members of the commission not be paid as wage or salary employees of the commission.

The Federation made no recommendation as to how much the gasoline tax should be increased, nor the car registration tax. It did, however, clearly stipulate how much additional revenues were required and that they should be raised from highway users rather than from the state's general fund. Experience has proved in Michigan that since 1930 appropriations from the general fund for highways were short-lived and were removed from the books within a year or two after their enactment.

Met First Rebuff

The Legislature in 1948 special session was expected to act upon these recommendations at that session. Kim Sigler, then Governor, indicated his willingness to "carry the ball for good roads in Michigan." However, the proponents of the good roads program were to meet their first rebuff when the Governor, conscious of his upcoming election six months later, adamantly refused, as was his constitutional prerogative in a special session, to allow the Legislature to consider an increase in the gasoline tax. In the final week of the session he did open up the discussion to an increase in truck taxes, but this obviously would not have provided sufficient funds to do the job and the bills then introduced died in committee.

It was then that the individuals closely associated with the engineering analysis "Highway Needs in

Copies of this Remarkable Summary are Available

As part of ROADS AND STREETS' continuing editorial effort for highway advancement, this summary is being circulated to committeemen in the 48 state legislatures and in the Senate and House in Washington—as well as to the officials, engineers and contractors who administer and construct the nation's roads and streets. A few reprinted copies from our limited supply will be sent free on request. Larger quantities will be reprinted at cost for organizations desiring to circulate the article to newspapers, civic organizations and influential citizens in their states. If interested please write promptly to the Editor, ROADS AND STREETS, 22 West Maple Street, Chicago 10, Illinois.

Highlights of Michigan's Sweeping Legislation, Result of a Sound

This sweeping overhaul affects administration, classification, finance and fund distribution. The Federation's entire recommended program was adopted virtually without change.

* *

A basic bill provides for classification of all roads and streets in the state; establishment of a state motor vehicle highway fund, in which all state motor vehicle revenues are to be deposited; establishment of a new distribution formula for sharing of highway revenues; uniform accounting, and advance planning and programming of projects by all agencies participating in state revenues.

* *

Additional revenues were provided in two bills increasing commercial license fees about \$5 million yearly, effective Dec. 1, 1951, and increasing the gasoline tax from 3 cents to 4½ cents and diesel fuel tax from 5 to 6 cents, effective June 1, 1951. The measures increase revenues about \$30 million yearly. Additional funds for construction from local sources

are expected in view of other provisions limiting state participation.

Other bills direct the state highway department to maintain all trunklines in municipalities, and allocate up to 40% of motor carrier fees collected by the public service commission for collection and administration and the balance to the motor vehicle highway fund.

* *

The Good Roads Federation waged its campaign for classification on principles established in the state-wide survey, stressing the need for segregating arterials and access roads and streets. Such action, the Foundation said, would bring equitable distribution of cost and insure uniform, standardized administration, construction and maintenance, and long range planning based on relative needs.

* *

The new laws permit the state highway commissioner, in the interests of better administration, to establish subordinate classification of the state trunkline highway system. Counties are required to establish system of primary roads,

composed of the most important routes, subject to approval of the state highway commissioner. All other roads are to be known as county local roads. Similar provisions are made for the incorporated cities and villages of the state, with designation of systems of major streets and of local street systems.

* *

A change of far-reaching importance is the new and simplified distribution formula for motor vehicle funds, effective July 1. The old formula was a complicated patchwork, constantly amended with little regard for need or equity. Under the new program the state motor vehicle highway fund is distributed as follows on established needs: 44% to the state highway department, 37% to the county road commissions, and 19% to the incorporated cities and villages.

* *

To meet deficiencies in urban areas, after operating expenses and maintenance, the state highway department must expend 40%

Michigan" fully realized how complex were their recommendations. From all corners of the state there arose criticism and complaints about the Federation's proposals and their impact upon individual county road commissions, cities and geographical areas of the state.

For example, many of the counties objected to the provision requiring the full time employment of a registered highway engineer. The northern part of the state objected to the new distribution formula inasmuch as it repealed the law requiring the state highway department to spend ¼ of its new construction funds in the Upper Peninsula and ¼ in the northern part of the Lower Peninsula. Cities, particularly the large ones, were in favor of the new distribution, but were lukewarm over the proposed increase in the gasoline tax.

Answered Local Critics

To answer local questions and objections, hundreds of speeches were made by Federation proponents in all corners of the state. It required correspondence with newspapers that literally ran into thousands of letters.

Then, when these basic criticisms

had been answered, there rose endless misunderstanding in connection with the formulas for distribution of funds to the individual counties and municipalities. When one stops to consider that 450 cities and incorporated villages ranging from populations of 200 to 2,000,000 must needs be satisfied tremendous burdens shouldered by the Michigan Municipal League in collaboration with the Federation in working out a distribution to all, which was still in line with street needs, and likely to be accepted by the Legislature.

The County Road Association of Michigan was faced with a similar problem in order to satisfy 83 county road commissions, likewise representing varying populations and economic backgrounds. Both of these efforts were complicated by the fact that past distribution had established a pattern which could not be erased in that no road agency would willingly accept a decrease in revenues. For this they can hardly be blamed, in view of rising costs and the fact that a tax increase would be imposed.

Throughout the remainder of 1948 and winter of 1949 proponents of the Federation program met with county

and city officials time and again until practically all criticism had been allayed. Yet no political leader arose to carry the Federation banner, and so long as the good roads program was identified with a tax increase, the only members of the Legislature willing to be identified with it were those from the less populous parts of the state. Consequently, in the 1949 session the program was bottled up in committee, where it remained.

Makes New Try

Following this legislative session, the Federation, its treasury depleted and its spirits low, came close to abandoning the program. Such a development would have been a serious blow to Michigan's highway progress. Not only were the Federation's proposals representative of good, sound highway legislation, but for the first time in the state's history all road interests were supporting a common effort. Hitherto, the state highway department, the counties and the municipalities had competed with each other bitterly in each legislative session for the lion's share of road revenues. This bickering over road funds was detrimental to highway progress. Yet, be-

Engineering Study and Vigorous Campaigning in Public Interest

of the remaining funds on trunklines within the limits of the incorporated places. The principle of city participation in state trunkline construction is continued. Elimination of the geographic distribution requirement now enables the state highway department to apply funds on a planned statewide basis.

In Michigan, beginning in the early 30's, property tax levies for highway purposes dropped rapidly to relatively small amounts. The new legislation recognizes the need for revenue beyond motor levies. The basic bill limits county local road expenditures to 25% of each county's share of state funds, and local street expenditures to 30% of each city's share. In effect the law limits state funds to about 50% of needed local road and street outlays. The Act states it is the intent of the legislature that those monies represent the total responsibility of the state for the local roads and streets, and that additional funds required must be

obtained from other sources as permitted by state law.

To encourage up-grading of county highway work, \$5,000 of state funds are to be granted each county in which the county road commission employs a full time registered professional engineer for the major portion of the year. Counties, however, are allowed a 5-year period of grace.

One of the most important provisions of the new legislation is the requirement for advance planning by all highway agencies. The counties and cities and villages must submit to the state highway commissioner biennial highway and street programs and past accomplishments based on long range planning, including standards and specifications for all projects.

Also, the local units must submit annual records of the use of all state motor revenue funds received. Separate records must be kept of local expenditures for the

cost of administration, engineering and record keeping.

Uniformity of local accounting is assured by the stipulation that the state highway department shall prescribe forms.

Biennially, the commissioner must report to the governor and the legislature summarizing the program for improvements by the state highway department, counties, cities and villages for the next biennium.

The official report also must describe progress made by the state highway department, the counties and the cities and villages, and account for all expenditures of state funds. This is in addition to the annual report on the receipt and allocation of state revenues.

All agencies which do not comply with the provisions of the basic Act will forfeit state funds during the period of noncompliance.

cause of failure for the good roads program to be adopted in two successive legislative sessions, it appeared that the "spenders" would be forced to revert to their unhealthy practice of fighting each other at the Capitol.

However, this development did not materialize. The Board of Directors of the Federation decided to hitch up their belts and make another try in the spring of 1950 legislative session. As was pointed out, the Governor could then dictate what subjects the Legislature could consider in a special session. Governor Williams, who had succeeded Kim Sigler the year before, had set himself up as a good roads champion, and in this special session he emphasized the tremendous need for a highway improvement program. However, the Governor wanted to finance those needs with an income tax on corporations. This proposal was contrary to the financial recommendations of the Federation, but, more than that, was hostile to the majority of the members of the Legislature. While they wanted a good roads program financed by highway users, they would not support a good roads program

financed by a corporation profits tax. The Governor would not allow the Legislature to consider a gasoline or weight tax and the Legislature would not consider a corporation profits tax. So, once again, the Federation program was stymied.

Focused Public Attention

However, the publicity attendant to the quarrel between the Governor and the Legislature focused the public's attention on the need for good roads. By this time road and street agencies, feeling the pinch for additional funds, even more than they did when the program was introduced, and having a better knowledge of the program rose up in much greater support of it than ever before.

Plans were laid for an all out fight for the good roads program in the 1951 regular session. Contacts with members of the Legislature running for election and statements by the various candidates for public office indicated overwhelming support for the program.

In January of 1951 the Legislature met and the Federation's bills were introduced in both houses by enough members of each house to insure their passage. However, "poli-

tics" was again to raise its ugly head and the Federation's legislation became the popular currency for legislative trading. As a result, it was mid-May before the Federation's bills were enacted into law and sent to the Governor for his signature. He had stated clearly that he would refuse to sign an increase in the gas tax of 1½¢, but would accept a 1¢ increase, provided it were accompanied by legislation he wanted passed. The majority of the members of the Legislature were not disposed to make such a deal and so the Governor vetoed the gasoline tax.

Detroit Votes Pledged

At this point a little history is in order. During the 1950 special session, the City of Detroit, anxious to complete its expressways in four instead of 14 years, asked the Legislature for permission to issue \$100,000,000 worth of bonds so that funds would be available immediately. Several members from Detroit were extremely anxious to have this legislation enacted.

The Chairman and some member of the key committees in connection with the bond issue for expressways

Mr. Legislator:

In pretty nearly every state the road systems are losing the battle with traffic wear and obsolescence, as you are well aware. And legislative action this year to raise new road funds has frequently been stymied by a confusion of aims and ideas. Mainly the trouble has been the lack of an engineering analysis of all the highway transportation needs of the state—and of clear and logical recommendations for legislative action based on this analysis, so obviously in the public interest that enactment becomes possible.

How much longer can your state wait for a solution to its problem of a retrograding highway system?

The national emergency and the demand for another all-out period of farm and factory production

give a new urgency to the need for stepping up highway modernization and giving your state's engineers the best administrative tools for the job. Scarcities or priorities notwithstanding, a way must be found to keep essential road and street construction and maintenance to the highest possible level, consistent with defense requirements.

Is your state one of the increasing number which have undertaken a statewide engineering investigation of the whole road problem?

A letter from you giving your viewpoint will be appreciated. We have benefited from the counsel and information thus received from lawmakers, and such replies will be held in confidence if you so desire.

Editor, Roads and Streets

were from rural Michigan. They were fearful that if expressways were taken care of by a bond issue there would be no effort to solve the state's road program with a gasoline tax. However, several Detroit members unequivocally pledged their support of the good roads program at the 1951 general session in return for enactment of the bond issue legislation.

In May of 1951 the promissory vote became due. It was now time for the Detroiters to make good on the good roads program.

The Senate overrode the Governor's veto within 20 minutes after receipt of his message. The vetoed bills were then rushed to the House of Representatives. It caught some of the members of the House off balance, particularly the Detroiters who are of the Governor's political faith, and so they voted to sustain him. The override vote was one short of the necessary 2/3 majority. However, on the following day it was moved to reconsider the vote by which the Governor's veto was sustained. This motion was then tabled and the Legislature adjourned for the week end.

Veto Overridden

During that period the members of the House from Detroit who had promised to vote for the good roads program were contacted by their supporters and by county and city offi-

cials who reminded them of their commitment made in the preceding legislative session. These men were by conviction backers of the good roads program, but had been subjected to terrific pressure to sustain the Governor.

On May 23, 1951, four of these Detroit members fulfilled their obligation to the people they represent and voted along with 66 other members to override the Governor, thus giving Michigan perhaps the nation's most advanced highway legislation—the good roads program.

Prominent labor groups vigorously opposed the program, threatening to bring suit in the Supreme Court on the basis that the vote to reconsider the override was illegal. The best legislative and legal counsel in Lansing indicates that the move was entirely correct and that the Supreme Court would so rule. At this writing no action has been taken to set aside the wishes of 70 members out of 100 of the House of Representatives and 25 out of 32 in the Senate.

To the everlasting credit of the cities, counties, state highway department and other groups backing the good roads program is the fact that for three and a half years they withstood the continued efforts of many groups and individuals attempting to disrupt the Federation's united front. The success of the program

can be attributed to the fact that the organizations and interests having a stake in road development were constant in their cooperation with and faith in each other—a powerful lesson in highway progress.

The program went into effect on June 1, 1951. The gasoline tax was increased 1½¢ and the weight tax on commercial vehicles over four tons was raised on a graduated scale from 20% to 80%. These measures will bring in about \$30,000,000 additional revenues. The entire good roads program, as outlined in the preceding paragraphs, was adopted.

As one newspaper man remarked when the Governor's veto was overridden—"The road problem is now out of the hands of the politicians and up to the road and street administrators. We shall see what they can do."

Scrap Drives Are Starting Again

Several highway departments recently have instructed their district office personnel to conduct a search and cleanup program for critical materials and materials which can be sold as scrap.

Steel shapes and other items vitally necessary to help keep equipment rolling should, of course, be held in stock. But the departments still are in a position to render a valuable public service here. Nearly every organization has stuck away somewhere unserviceable or condemned tires and tubes, mixed scrap iron, heavy scrap iron parts, oil and tar drums unfit for further use, aluminum or copper, tin or brass scrap, junk storage batteries, etc.

It won't hurt anyone to be on the alert for ways to co-operate by gathering up and disposing of such scrap materials.

250,000 Cross Camden Bridge in Week-End

Indicative of growing traffic volumes everywhere, a new travel record was set for the Delaware River bridge between Philadelphia and Camden on the week-end of June 15-17. The Sunday count was 95,515 vehicles, and the 3-day week-end count 250,982. Best previous records were respectively 93,010 and 244,718, made in 1950.

IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS

Citizens of Many Nations Forming Good Roads Associations

Well planned highways generate social and economic benefits that are immediate for the people and the nation they serve. The development in motor vehicle transportation, which follows the building of good roads, under favorable conditions ushers in higher living standards through more efficient intercommunication, more rapid industrialization, and wider marketing of food products and manufactured goods.

Inspired by these benefits which have been so dramatically demonstrated in recent years, the International Road Federation since its founding in 1948 has cooperated with citizen groups and business leaders in many countries of the world. The purpose has been to give counsel in the forming of "good roads" associations, the common goal being to encourage the development of adequate national highway systems.

The success of the Federation has been outstanding, and to date the Federation's activities have been projected into more than 50 countries where free enterprise exists. Nineteen of these countries have national good roads associations affiliated with the Federation. Similar organizations, meantime, are in various stages of formation and the Federation has expectations of ending 1951 with national affiliates in at least 30 countries.

During 1950, the Federation acquired five new national affiliates, four in the Western Hemisphere and one in the European-East area. National "good roads" associations were nonexistent in Latin America and there was only one such association in the whole Western Hemisphere outside the United States three years ago. The existing association at that time—in Canada—was not too active but since has become a very strong organization. There are now nine associations in Latin America and three more are in formation.

The Egyptian Road Association was organized in 1950 as an affiliate of the Federation in the European-East Region. Also under this region are the British Road Federation, Union Routiere de France, Centraal Overleg, Svenska Vagforeningen, Federation Routiere Suisse, Indian Roads and Transport Development Association, Federation Routiere Belge and the East African Road Federation. In formation are associations in Ceylon, Pakistan, South Africa, Australia, New Zealand, Thailand and Iraq.

Each of these road associations is

dedicated to promoting the education of both the public and the government in the social and economic benefits generated from adequate road systems. Each is a clearing house for information related to highways and highway transport. Each provides a non-government approach to technical assistance in the planning, financing and development of highways.

The Federation which has offices in Washington and London, will soon open a third office in Paris. The Paris office, in addition to being the headquarters for continental Europe, Turkey and Greece, will participate in all international meetings on highways and highway transport at Geneva.

Roy Crum of Research Board Passes

Roy W. Crum, for nearly a quarter of a century director of the Highway Research Board in Washington, died May 13. He was 66. Since 1928 he had guided the Board, during a period when its work assumed constantly growing importance and resultfulness.

Graduating from Iowa State College in civil engineering in 1907, Mr. Crum was a teacher at this school until 1919, when he left to take charge of the newly created materials testing department of the Iowa Highway Department. In this position his per-



★ Roy W. Crum

sonal and professional abilities came to the fore, stamping him as one of the pioneers in research in highway materials and related problems.

During the years that followed highway research activities developed on such a scale that a national agency to coordinate and foster orderly research was seen to be needed. The Highway Research Board was created and Mr. Crum was made its director in 1928. In the years since then the Board's activities have broadened, until today they encompass several departments and some 70 committees reaching into every phase of highway engineering.

IRF and "Point 4" Plan Joint Program

The International Road Federation, with offices in Washington, D.C., London, Paris and affiliated good roads associations in more than 30 countries, will participate with the U.S. Government's "Point 4" in a unique technical assistance program. As announced by Harry G. Bennett, Technical Cooperation Administration, Washington, D.C., the effort will aid good roads campaigns eventually covering Latin America, the Near East and Southern Asia.

This agreement signals the first step taken by a broad base of private industry in the U.S. and in other countries to participate in the technical assistance program of the United States government. The International Road Federation, known familiarly as IRF, is sponsored by more than 350 private companies. Its affiliated good roads associations are sponsored locally in each country. Through the IRF and its affiliates, many of the com-

panies in the U.S. and elsewhere will provide technicians, machinery, equipment, materials and working space for certain educational projects outlined in Point 4 agreement. On the basis of a survey to be made by IRF, it is planned to develop a long-range highway aid program under Point 4 and to extend industry's participation in subsequent IRF-Point 4 agreements. A grant of \$85,000 was made by TCA to finance the initial phase of three activities, as follows.

1. Two pilot schools for training operators and mechanics in the use of farm and highway equipment.
2. Inauguration of Point 4 fellowships for engineers in countries outside the U.S. to study advanced techniques in U.S. universities.
3. A survey for the purpose of determining the kind and extent of technical assistance required for a long-range technical assistance program by various nations.

JOB and EQUIPMENT IDEAS

Sheepsfoot Tamper for Narrow Ditch Backfill

An interesting device built by a contractor for tamping backfills in a narrow trench is pictured here. The Conduit Contracting Company of Fulton, Missouri, used this machine in a roadside ditch in connection with installation of utility piping.

The machine is a Ware loader frame mounted on an Oliver crawler tractor. In place of the loader bucket there has been installed a special 8-in. wide cylinder studded with 2-in. diameter cylindrical tubes welded on to form tamping feet.

Of course, there are trench rollers and trench rollers but we seldom see one that is only 8-in. wide designed to work in trenches less than a foot in width.

Trailers Built for New Mexico Maintenance Men

The New Mexico State Highway Department this past winter designed and built two sets of trailers consisting of three units each, for use by the department's surface treating crews when away from towns of any size.

The units were designed in accordance with the department's own specifications, and built in the shop of a manufacturer at Albuquerque. The units will provide living and sleeping quarters, cooking facilities, office and drafting room space, and a place for equipment and tools. According to

L. D. Wilson, department administration engineer, units as completed have been very satisfactory except for one item. The gasoline powered electric generating plant was installed inside one of the units and although provision was made to refuel from the outside, the operation of the plant proved unpleasant to occupants of the trailer. It is planned to put the light plant on a separate trailer if any future units are built.

Ripper Teeth Effective on Dozer

New type ripper attachments for bulldozers were said to have saved 62% on roadbed leveling costs on a recent job in Shasta National Park in Northern California. Five Hensley rippers attached to the blade of a 13-ft. LeTourneau angledozer uprooted about 75 ft. of brush in each run at a cost of \$60 per mile, according to one report. This was compared



★ Scene during fabrication of big trailers, designed for New Mexico Highway Department's asphalt road crews to use when away from large towns



★ The sheepsfoot drum on this homemade outfit is only 8-in. wide





★ (Left): ripper equipped dozer working in Shasta National Park. (Right): the city of San Jose used this unit

to the former \$160 per mile hand grubbing cost. The equipment removed a heavy growth of brush, numerous three and 4-ft. boulders in widening an access road.

Another instance where ripper teeth on a dozer blade served effectively was reported by the public works department of San Jose, California. The operator, using an Allis-Chalmers HD-7 tractor equipped with a Baker straight blade dozer so fitted out, ripped out a borrow pit in cemented rock.

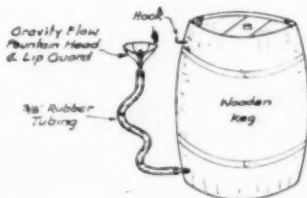
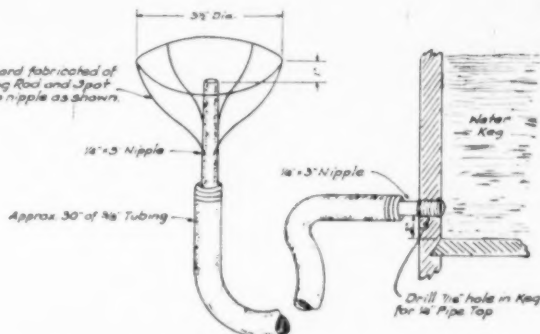
Rippers of this type (pictured) are designed to dig to a depth of 12 in. if there is not an excessive amount of rock in the surface. When a large amount of rock or shale is encountered, adequate ripping action can usually be obtained in two 6-in. passes.

Old I-Beams Adapted for Bridge Work

The Texas Highway Department has made extensive use of salvage I-beams in the strengthening or reconstruction of floor systems in highway bridges. Also in constructing complete new spans in some instances.

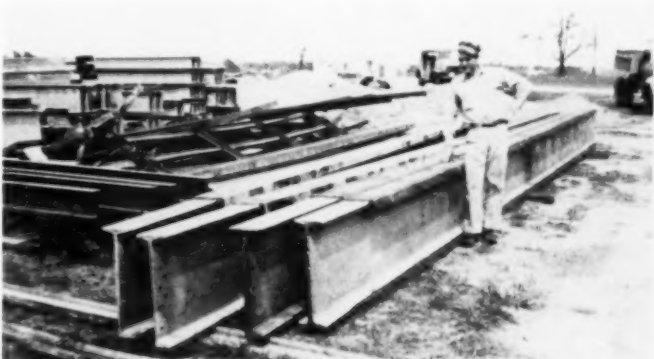
This photo shows how beams have been spliced to secure the desired length, and boxed or tied together in pairs, as part of a bridge floor rebuilding schemes. Plates have been welded over the top and bottom flanges, the plates extending over the flange edges, and covering most of the beam length.

Effort of this kind is considered to have a double value today. It helps utilize all manner of available salvage shapes, at a time when steel is hard to "come by." And advantage is taken of the fact that many bridges can be made to carry considerably higher live loads with safety strengthening the floor system alone, the floor usually being the weakest part of old bridges.



BILL OF MATERIAL
 1-New Wooden Keg or Milk Can
 1-Pc. 3/4 Rubber Tubing 30" Long
 1-1/2" x 3" Pipe Nipple
 1-1/2" x 3" Pipe Nipple
 1-Pc. 1/2" Metal Rod 24" Long
 Construction Time: 40 Min.

★ A proposed method of dispensing drinking water, as designed for the Pennsylvania Turnpike Commission, utilizing an approved and economical gravity flow fountain supplied from a barrel



★ Salvage I-beams spliced to required length and tied together in pairs with plates top and bottom—part of scheme to adapt the steel to new bridge use

The Angle Prism

and its Application to Highway Surveying Work

This little hand instrument can reduce field and office labor and often take the place of transit and tape

By H. S. Wahlen

ONE of the most useful instruments for reducing field and office work in preliminary highway as well as location surveys is the right angle prism. This convenient and accurate hand surveying instrument has multiple uses in highway and road surveys. Quite often it is possible to eliminate costlier transit and tape measurements, but it is hardly ever found in the instrument equipment of a survey party.

The reflecting right angle prisms are triangular or pentagonal prisms,

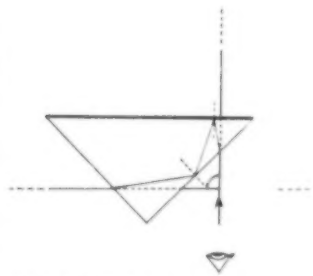
precisely ground so as to produce a 90-degree deviation of a light ray.

The triangular right angle prism is manufactured with two equal sides enclosing a 90-degree angle. The third side is silvered. A ray entering the prism is twice reflected as shown in Fig. 1. The prism can be used with an ordinary plumb bob or with a special telescoping plumbing rod (Fig. 5) to which a plumb bob is fixed.

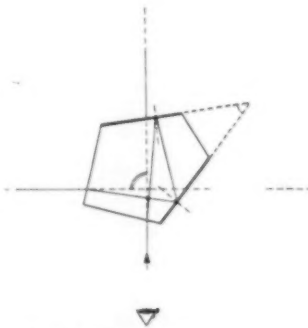
The pentagonal prism is far superior to the triangular prism. The re-

flecting image is clearer and the field of view considerably larger. An entering ray is twice reflected and a 90-degree deviation of the ray is obtained (Fig. 2).

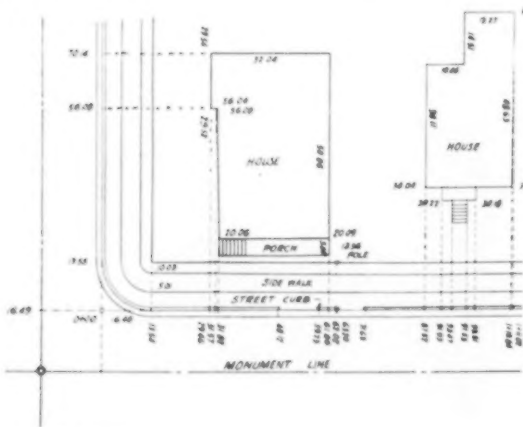
The most useful pentagonal angle prism is the double which permits the measurement of angles of 90 degrees as well as angles of 180 degrees. The instrument consists of two pentagonal



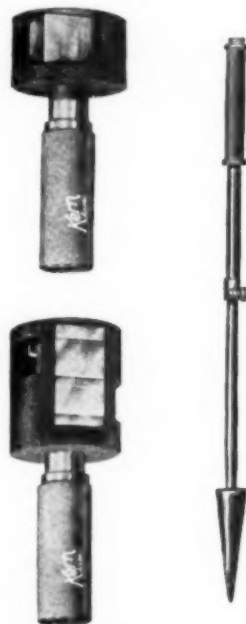
★ Fig. 1. Triangular prism



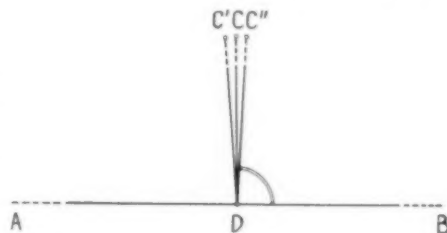
★ Fig. 2. Pentagonal prism



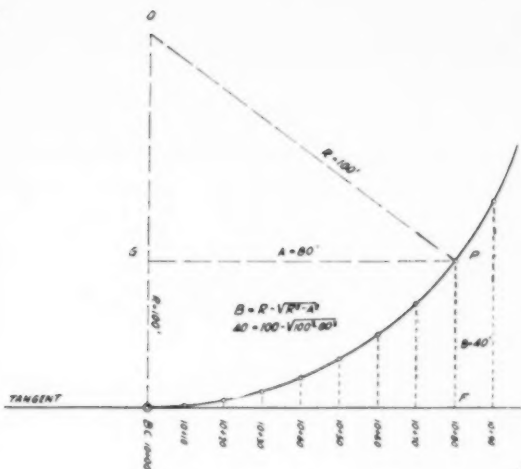
★ Fig. 7. Detail survey



★ Fig. 3-4-5. Pentagonal right angle prism, double pentagonal right angle prism, and telescoping plumbing rod



★ Fig. 6



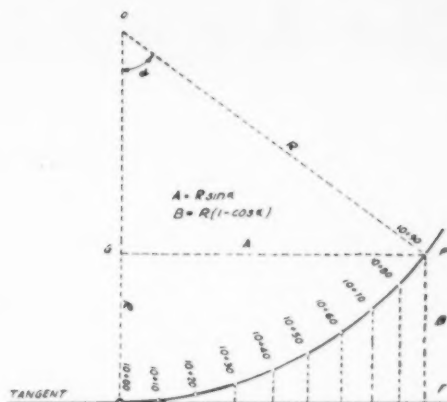
★ Fig. 8. Curve by offsets from tangent

right-angle prisms set one above the other.

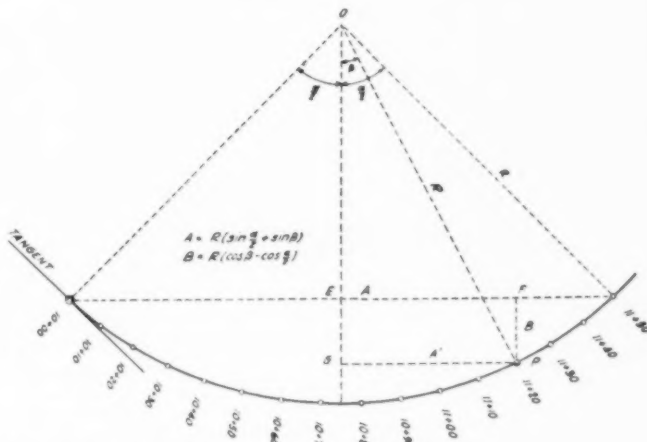
A field check to determine the working accuracy of a right-angle prism can easily be made by setting the prism over a point D in the line AB (Fig. 6). The right angle ADC at D should produce point C, but point C' is obtained instead. On the other hand the offset point C'' is found by establishing the right angle BDC'' at D and the angle C' D C'' is double the working error of the right-angle prism. However this error is due more to an accidental than an instrumental error of the prism. Since this accidental error is considerably larger than the instrumental error it is advisable to check the complementary right angle.

If it is desired to offset a point C within 0.01 ft. and the working accuracy of the right angle prism is one minute then the offset distance should not exceed 0.01/0.00029 or 34 ft.

The right angle prism has many applications in surveying work as will



★ Figure 9

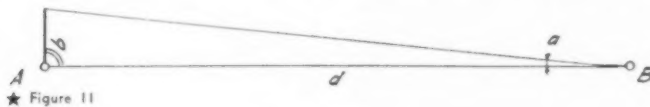


★ Fig. 10. Curve by offsets from chord

be shown in the following few examples. Fig. 7 shows a detail survey

made with a right angle prism. The center line of the street being the monument line is offset and in order to keep the survey party away from the street traffic and protect the survey markings from destruction the gutter line is used as reference line. Right angle offsets are taken to all points of interest for the detail survey. Two measuring tapes are generally used, in this case, one to measure the stationing and the other to measure the offsets. All notes should be shown by sketches in a fairly large scale in a similar manner as shown in Fig. 7 which will facilitate the office work.

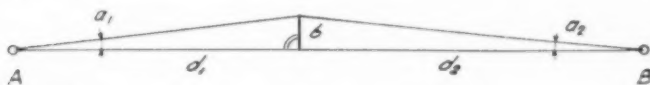
Building dimensions should be measured for a check. If irregular
(Continued on page 92)



★ Figure 11



★ Figure 12



★ Figure 13

How Army and Navy

Defense Construction Contracts are Handled

CONTRACTORS interested in doing work for the armed forces will find use for this summary covering contract, allotment and control procedures.

As described by R. G. Lovett, Col., Corps of Engineers, and B. S. Shute, Col., Corps of Engineers, in *The Military Engineer*, March-April, 1951, the army engineer procurement is as follows:

Engineers Military Projects

Under ordinary circumstances it is the policy of the Corps of Engineers to let all military construction by lump-sum contract after competitive bidding except when reasons of National Security or other compelling considerations necessitate the use of negotiated contracts. Because of the present national emergency and the expanded construction program, it is expected that negotiated lump-sum or cost-plus-a-fixed-fee contracts will be used to a greater extent.

The construction program is executed through a decentralized organization of division engineers and their subordinate district engineers. The divisions and districts now performing military construction and the territory they comprise, are indicated on Map 2. The addresses of the Divisions and other Districts are listed under Civil Works below.

The District engineers are the contracting officers on construction contracts, and it is in their offices that bids are opened when construction is advertised. Under most circumstances, the award to the successful bidder can be made by the division or district engineer without recourse to higher headquarters. At present the field offices of the Corps of Engineers have authority to award negotiated contracts up to \$5,000,000. Construction projects for which the Corps of Engineers has design responsibility are assigned to the appropriate district engineer for accomplishment. Selections and recommendations for the use of architect-engineers on specific projects are made by these officers. All architect-engineer contracts are negotiated.

Engineer firms or architect-engineer firms are employed whenever the design of an authorized military construction project can not be accomplished in a timely manner with available Government forces or when the project requires technical facilities and specialized skills not available in the district. Emphasis is placed on selecting firms or individuals experienced in the design of the particular type of project involved, and with the ability to organize sufficient personnel to expedite the work. Construction anticipated in the immediate future will require the use of architect-engineer services, because of the considerable volume of design work to be accomplished.

Information on Contractors. Construction contractors or architect-engineers who are interested in performing major construction or rehabilitation and minor construction work for the Corps of Engineers should provide information on their organization, background, and experience to each district engineer having jurisdiction over areas in which they would like to work. The same information should be furnished the Chief of Engineers, Washington 25, D.C., attention of the Assistant Chief of Engineers for Military Construction. If there is a material change in these data, the submission of amended information would be advisable. The following are suggested as the types of information which will be of assistance to all concerned in evaluating the qualifications of contractors:

Architect-Engineers:

Fill out and submit *Engineer Form 1774*—Architect-Engineer Questionnaire.

Construction Contractors:

Fill out and submit *Engineer Form 459* (Data on Contractors), and prepare and submit brochure, if available, including a brief background of the organization and key personnel (indicate security clearance, if any, already on record), financial data (balance sheet, credit capacity), list of major projects performed in past 10 years (owner, type, cost), list of major items of construction plant, and such other information as is deemed pertinent. It is not required that contractors incur the expense of preparing brochures as a condition to their receiving consideration. However, if such data are available, they may prove to be of mutual benefit. Information on joint-venturers may be consolidated on *Form 459*. However, if brochures are submitted, it is desirable that they be

furnished under one cover with the record of each participating company shown separately. *Contractors desiring to be placed on bidders lists should so indicate to any of the district offices in which they are interested.* The submission of *Form 459* or a brochure will not in itself accomplish this since the data are primarily for reference in selection of contractors for negotiations.

Engineer Civil Works

In addition to construction and supply for military purposes, the Corps of Engineers is charged by law with the planning, construction, operation, and maintenance of public works for flood control, hydroelectric power, improvement of navigation, and other related water uses—commonly referred to as the "Civil Functions of the Corps of Engineers."

The Civil Functions are carried out under the direction of the Chief of Engineers by forty-two Engineer Districts located throughout the United States and in Alaska, under the immediate supervision of eleven Division Offices located strategically throughout the country. The district office is the basic unit charged with the field planning and execution of public improvements.

District engineers are designated as contracting officers, with authority to accomplish procurement and to execute formal and informal contracts necessary in the prosecution of Civil Works activities under the jurisdiction of the respective districts. Within prescribed monetary limitations, division and district engineers are delegated authority to issue specifications and to award contracts. The construction of civil works is normally performed by contract, awarded as the result of competitive bidding.

The addresses of division engineer offices and district engineers:

GREAT LAKES DIVISION,* 1660 East Hyde Park Boulevard, Chicago 15, Illinois—*Buffalo District*, Engineer Park, Buffalo 7, New York; *Chicago District,** 520 Merchandise Mart, Chicago 54, Illinois; *Detroit District,** 2015 Cadillac Tower, Detroit 31, Michigan; *Duluth District*, Engineer Building, Canal Park, Duluth, Minnesota; *Milwaukee District,** 428 Federal Building, Milwaukee 1, Wisconsin.

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The complete International Truck Saver Plan has been developed by experts, after a thorough study of today's truck operating problems. It offers these benefits to International Truck operators:

1. **Better performance** over a longer truck life: trucks are kept in shape to do the most efficient job possible until they can be replaced by new units.
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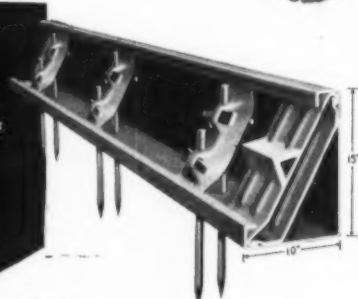


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MISSOURI RIVER DIVISION,* 206 South 19th St., Omaha 1, Nebraska—*Fort Peck District*, Administration Building, Fort Peck, Montana; *Garrison District*, Bismarck, North Dakota; *Kansas City District*,* 10 East 17th St., Kansas City 8, Missouri; *Omaha District*,* 1709 Jackson St., Omaha 2, Nebraska.

NEW ENGLAND DIVISION,* mail address P. O. Box 2316, Boston 7, Massachusetts, office in Building No. 21, Boston Naval Shipyard, South Boston, Massachusetts.

NORTH ATLANTIC DIVISION,* 1216 Federal Office Building, 90 Church St., New York 7, New York—*Baltimore District*,* 24th and Maryland Avenue, Baltimore 3, Maryland; *New York District*,* 80 Lafayette St., New York 13, New York; *Norfolk District*,* Foot of Front St., Norfolk, Virginia; *Philadelphia District*,* 121 North Broad St., Philadelphia 1, Pennsylvania; *Washington District*,* 1st and Douglas Sts., Washington 25, D. C.

NORTH PACIFIC DIVISION,* 10th Avenue and Washington St., Portland 5, Oregon—*Alaska District*,* Anchorage, Alaska; *Portland District*, 828 Pittock Block, S. W., Portland 5, Oregon; *Seattle District*,* 4736 East Marginal Way, Seattle 4, Washington; *Walla Walla District*, 19 East Poplar St., Walla Walla, Washington

OHIO RIVER DIVISION, Post Office and Courthouse, Cincinnati 1, Ohio—*Huntington District*,* Madison Avenue and 8th St., West Huntington, West Virginia; *Louisville District*,* 830 West Broadway, Louisville 1, Kentucky; *Nashville District*, 303 U. S. Courthouse, 7th Avenue and Broadway, Nashville, Tennessee; *Pittsburgh District*, 925 New Federal Building, Pittsburgh 19, Pennsylvania.

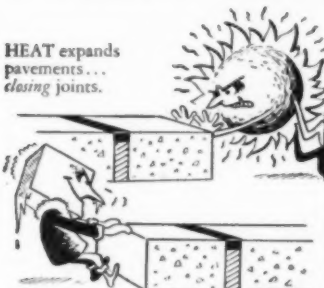
SOUTH ATLANTIC DIVISION,* 836 Old Post Office Building, Atlanta 1, Georgia—*Charleston District*,* 33 Customhouse, Charleston 1, South Carolina; *Jacksonville District*,* 575 Riverside Avenue, Jacksonville, Florida; *Mobile District*, 2301 Grant Street, Mobile 7, Alabama; *Savannah District*,* P. O. Box 889, Savannah, Georgia; *Wilmington District*,* 308 Customhouse, Wilmington, North Carolina.

SOUTH PACIFIC DIVISION,* Oakland Army Base, Oakland 14, California—*Los Angeles District*,* 741 South Figueroa Street, Los Angeles, California; *Manila District*, A.P.O. 928, c/o Postmaster, San Francisco, California; *Sacramento District*,* 1209 8th St., Sacramento 8, California; *San Francisco District*,* 180 New Montgomery St., San Francisco 19, California.

SOUTHWESTERN DIVISION,* 1114 Commerce St., Dallas 2, Texas—*Albuquerque District*,* P. O. Box 1538, Albuquerque, New Mexico; *Fort Worth District*,* 1127 Texas and Pacific Building, Fort Worth, Texas; *Galveston District*,* 606 Santa Fe Building, Galveston, Texas; *Little Rock District*,* 300 Broadway, Little Rock, Arkansas; *Tulsa District*,* 2000 North

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UPPER MISSISSIPPI DIVISION, 1114 Market Street, St. Louis 1, Missouri—Rock Island District, Clock Tower Building, Rock Island, Illinois; St. Louis District, 808 U. S. Courthouse and Customhouse, St. Louis 1, Missouri; St. Paul District, 180 East Kellogg Boulevard, St. Paul, Minnesota.

Tallahassee District,* P. O. Box 2091, Tallahassee, Tennessee.

Conclusions

Persons and firms desiring to do business with the Corps of Engineers in connection with * * * military construction or civil works, should get in touch with the appropriate field district or office as listed above, each of which maintains bidders' lists, issues invitations to bid, and executes and administers contracts. It is emphasized that, in dealing with the Corps of Engineers, it is not necessary to go to Washington.

Navy Engineer Procurement

Following is an abstract of an article, "Navy Engineer Procurement", by E. R. Hansen, Captain, Civil Engineer Corps, U.S. Navy, and Warren E. Young; *The Military Engineer*, March-April, 1951.

The Navy Bureau of Yards and Docks and its military component, the Civil Engineer Corps, is charged with the design, construction, and maintenance of naval shore establishments. This involves, at present, a large-scale program of construction and rehabilitation of naval installations; and the procurement of construction, weight handling, utility, and automotive equipment.

To carry out this increased program, the Bureau has decentralized authority to its nation-wide field organization which consists of sixteen public works offices (DPWO), one in each of the fourteen Naval Districts, and one in each of two Naval Commands. Each of these offices is a miniature of the Bureau organization. In addition, for certain large construction projects, an independent officer-in-charge of construction reports directly to the Bureau. The addresses of these offices and the areas included in their districts are shown in the following list.

DISTRICT PUBLIC WORKS OFFICES

(Areas served by each office are given in italics)

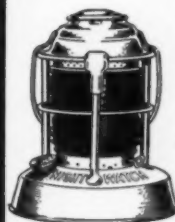
Maine; New Hampshire; Vermont; Massachusetts; and Rhode Island—District Public Works Office, First Naval District, 495 Summer Street, Boston 16, Massachusetts.

Connecticut; New York; northern part of New Jersey—District Public Works

*Also perform Engineer Military Construction functions.

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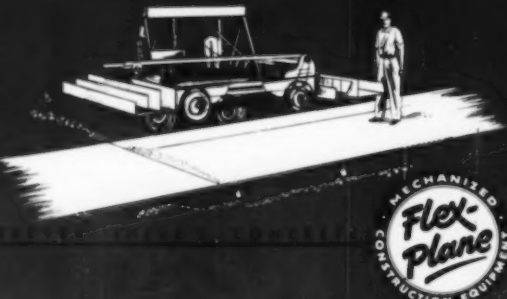
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Office, Third Naval District, 90 Church Street, New York 7, New York.

Pennsylvania; southern part of New Jersey; Delaware; and Ohio—District Public Works Office, Fourth Naval District, Building 1, Naval Base, Philadelphia 12, Penn.

Maryland; West Virginia; Virginia; and Kentucky less Severn River Naval Command and Potomac River Naval Command—District Public Works Office, Fifth Naval District, Naval Base, Norfolk 11, Virginia.

North Carolina; South Carolina; Georgia; Florida; Alabama; Tennessee; and Mississippi—District Public Works Office, Sixth Naval District, P. O. Box 365, Naval Base, Charleston, South Carolina.

Louisiana; Arkansas; Oklahoma; Texas; and New Mexico—District Public Works Office, Eighth Naval District, Building 16, U. S. Naval Base, New Orleans 12, Louisiana.

Michigan; Indiana; Illinois; Wisconsin; Minnesota; Iowa; Missouri; North Dakota; South Dakota; Nebraska; Kansas; Colorado; and Wyoming—District Public Works Office, Ninth Naval District, Administration Building, Great Lakes, Illinois.

Cuba; Dominican Republic; Puerto Rico; West Indies; Virgin Islands; Jamaica; and various other Caribbean Sea areas—District Public Works Office, Tenth Naval District, Naval Air Facility, San Juan, Puerto Rico, F.P.O. 116, New York, New York.

Arizona; Clark County, Nevada; southern part of California—District Public Works Office, Eleventh Naval District, 1220 Pacific Highway, San Diego 30, California.

Utah; Nevada (less Clark County); and northern part of California—District Public Works Office, Twelfth Naval District, Federal Office Building, San Francisco 2, California.

Washington; Oregon; Idaho; and Montana—District Public Works Office, Thirteenth Naval District 1611 West Wheeler Street, Seattle 99, Washington.

Hawaiian Islands; Midway Islands; Kure; Wake; Johnston; and Palmyra Islands; Kingman Reef and Kwajalein Atoll (Marshall Islands)—District Public Works Office, Fourteenth Naval District, Pearl Harbor, T. H., F.P.O. 128, San Francisco, California.

Panama Canal Zone—District Public Works Office, Fifteenth Naval District, Balboa, Canal Zone, F.P.O. 121, New York, New York.

Alaska and Aleutians—District Public Works Office Seventeenth Naval District, Kodiak, Alaska, F.P.O. 127, Seattle, Washington.

District of Columbia the counties of Prince Georges; Montgomery; St. Marys; Calvert; and Charles in Maryland and the counties of Arlington; Fairfax; Stafford; King George; Prince William; Westmoreland, Virginia; and Alexandria, Virginia—District Public Works Office, Potomac River Naval Command, Naval Gun Factory, Washington 25, D. C.

Anne Arundel County, Maryland—Commandant, Attn.: Public Works Officer, Severn River Naval Command, Annapolis, Maryland.

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 DOMINION METAL & CULVERT CORP.
 ROANOKE, VA.
 EATON METAL PRODUCTS CORP.
 OMAHA, NEB.
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 EATON METAL PROD. CO. OF MONTANA
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**STANDS UP
UNDER
45-FOOT
FILL!**

Here two lengths of Toncan Iron Corrugated Metal Pipe—72-inch diameter, 8-gage—support 45 feet of fill.

Pile on the dirt! Toncan Iron Corrugated Metal Pipe has the strength to carry it . . . the flexibility to stand up under heavy loads, vibration, impact, severe weather changes and settling earth. It will not crack or crumble in hauling or in service.

Toncan Iron stands up in service, too. An **ALLOYED IRON** containing twice the copper in copper-bearing steels and irons—*plus* the proper amount of molybdenum to make the copper do its work—it has the highest rust-resistance of any ferrous material in its price class.

Toncan Iron Corrugated Metal Pipe is easy to handle, too—and easy to install—with unskilled labor.

See your nearest Toncan Iron Manufacturer—or write us

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Toncan Copper Molybdenum Iron Drainage Products include:
 Corrugated Metal Pipe • Perforated Corrugated Metal Pipe • Sectional Plate Pipe
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ANOTHER BREAK IN THE DIKE!

Tough words to hear when you're battling a river on a rampage. But that's what happened during the recent disastrous floods on the Fraser River in British Columbia.

Perhaps you don't have to keep "rivers caged up," but that's an important job for Fraser River Pile Driving Co., Ltd. and their experience again proves the unusual mobility and handling ease of MICHIGAN cranes.

Says K. A. Matheson of the above company, "In the City of Mission on the Fraser River, the MICHIGAN cranes did a splendid job owing to their mobility and being able to get from one break in the dikes to another in very short order. In particular the TLDT-20 with remote control was a decided advantage, as it enabled us to do the same work with one less man when labor of this sort was badly needed on other flood-fighting work."

Regardless of your type of work, when you need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's your best buy!

MICHIGAN POWER SHOVEL COMPANY

480 Second Street, Benton Harbor, Michigan, U. S. A.

The DPWO is authorized to make awards on competitive bid contracts up to \$1,000,000.

Naval Shore Construction

Construction work is let under competitive bid contracts, under negotiated lump-sum or unit price contracts, and under cost-plus-fixed-fee (CPFF) contracts. It is the policy of the Bureau to make awards on a competitive bid basis, and to resort to negotiated awards only when the nature of the work and the exigencies of the service make such action in the best interest of the government.

Under the competitive bid contract, the award is made after advertisement and receipt of sealed proposals based upon plans and specifications, to the lowest bidder who meets the specifications. Such construction is advertised on bulletin boards in all DPWO offices, in all Federal buildings, in the Bureau, and in the plan room of the Associated General Contractors. It is also listed in Dodge Reports, the Department of Commerce Reports, and in various trade journals. Liaison between interested bidders and the nearest DPWOs will result in early information on prospective work.

Negotiated lump-sum contracts or unit-price construction contracts are awarded by the Bureau. After interviewing a group of contractors selected on the basis of their qualifications, the contractor deemed best qualified is chosen. If a satisfactory lump-sum or unit price can then be agreed upon, the contract is made.

The Army Engineers and the Bureau of Yards and Docks are following a uniform standard in determining fees on CPFF construction contracts.

Cost-plus-fixed-fee construction contracts also are let by the Bureau. They are awarded after negotiation.

To be considered for a negotiated contract, the qualifications, capabilities, experience, and record of the contractor should be well known to the DPWO as he selects or recommends the contractors to be considered. It is, therefore, desirable that qualified contractors keep the local DPWO fully informed as to their availability and suitability for consideration in such awards.

In the case of construction projects in which subcontractors are interested, full information as to the prospective prime contractors may be obtained from the DPWO of the area in which the work is to be performed.

It is the policy of the Bureau that Architect Engineer contracts will not be awarded on the basis of cost competition. Such contracts are negotiated. The contracts are usually ne-

gotiated and awarded by the DPWO, after obtaining Bureau approval of the fee. Large contracts are normally negotiated and awarded by the Bureau.

It is emphasized by the Bureau that full details with respect to construction contracts, competitive and negotiated, may be obtained from any DPWO, regardless of where the work is to be done. Interested contractors are urged to keep in touch with local DPWOs which serve the areas with which they are concerned.

It is not necessary to go to Washington to transact business with the Bureau unless invited to do so by the Bureau of Yards and Docks in the case of negotiated awards.

Reader Comment

Editor, ROADS AND STREETS:

This comment is prompted by your letter and accompanying editorial from April ROADS AND STREETS on toll and free roads. The editorial is a sound summary of the situation.

I am completely in favor of a realistic program of financing that will provide adequate free highways to serve all of the traffic on an equitable basis.

Parts of our state fall into the metropolitan category you mention and, in consequence, we have what may be termed successful toll facilities. While our three toll bridges fall into the regular pattern of toll-retired bond facilities, our parkway toll stations do not.

Briefly stated the parkway situation is this. Tolls were levied at two stations to provide for the extension of the parkway system after the initial 38 miles (Merritt Parkway) were opened to use. The Wilbur Cross Parkway was constructed between Milford and Meriden using the money derived from these stations. We have availed ourselves of the provisions of the law permitting additional stations where an alternate free road exists and are opening a third station. Receipts from it will be added to the construction fund. In this connection it should be remembered that our entire parkway system is closely paralleled by free roads. When the final construction costs are met the parkway tolls expire.

Despite the success of our parkway toll plan I would prefer to see all of our roads free of tolls and completely capable of meeting the demands upon them.

G. Albert Hill,
State Highway Commissioner

The MAJORITY of Your Heavy Hauling Jobs can be handled PROFITABLY with... the POPULAR



➤ ROGERS Type "T"

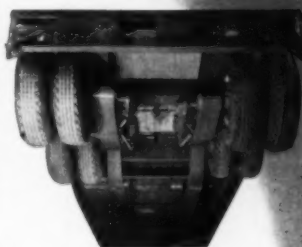
**LARGE CAPACITY IN AN 8 FT. DECK
WIDTH—LEGAL IN ALL STATES. 8
TIRES ON 2 ROCKING STUB AXLES
WITH LEVEL OR DROP DECK IN 15,
20, 25, 30 and 35 TON CAPACITIES**

By reason of its versatile adaptability to all kinds of heavy hauling jobs, the Rogers Type "T" has steadily increased in popularity.

It's a "natural" for small and large contractors and haulers.

If you are considering the purchase of one or more trailers, by all means investigate the Type "T".

It packs powerful advantages in a multi-purpose single unit. Write for full details and catalog.



A worm's-eye view of the sturdy rear end and frame construction of the famous "T".

The rear end design of the Type "T" has proved so efficient it has been adopted as standard construction in Rogers Power-Lift Detachable Gooseneck Trailers.

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builds 'em

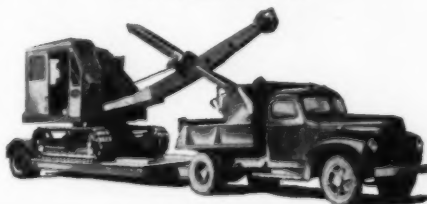


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ROGERS BROS. CORP.

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110 Orchard Street



Also of timely interest in this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizeable savings for contractors.

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**On every type of
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with Roebling**

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. It has to pass the most stringent tests for strength, fatigue and abrasion resistance . . . gives rope the extra life that spells economies. Besides, Roebling Preforming assures you top performance on the job. "Blue Center" Preformed is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping.

Roebling makes a complete line of wire rope . . . offers the right grade and construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.



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with the Tapered Sleeve Splice come to you ready for the job. They cost less than tuck splices . . . have the full strength of the rope. Send for the full story.

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Bituminous

ROADS AND STREETS



• Paving on the New Jersey Turnpike, where a million tons of asphaltic concrete is being placed this summer. Photo shows placement of crushed stone for the first penetration macadam base course. (Detailed report in a later issue of Roads and Streets)

Published by Gillette Publishing Company
22 West Maple Street, Chicago 10, Illinois

Ohio Contractors Handle \$3,000,000 Spring Repair Program
Another New Mexico Hot-Mix Resurface Project
Control of Hot-Mix Asphaltic Concrete, Simply Described
Early Patching Methods Following "Worst" N.Y. Winter

JULY, 1951

WHY YOU GET IMPROVED HEATING, BETTER ROADABILITY, EQUALIZED LOAD DISTRIBUTION



Etnyre Tank is a
long, low oval

ETNYRE TANK

← Circulating System
BELOW Tank

Short, High
TANK

Circulation
System

↑ Circulating System
on level with and
at one end of Tank

Get the Facts! Here is an exclusive Etnyre feature of interest to every owner and operator of a bituminous distributor. It's the secret of Etnyre's success in building the finest spraying mechanism known today.

On a Tank of any capacity, on any given cab to axle, Etnyre uses a longer Tank with a lower center of gravity. This is possible because the Etnyre Circulating System is located **BELOW** the Tank. The results are:

Improved heating...more flue area per gallon of material—longer Tank allows for smaller oval, longer flues—less distance for heated material to travel from

flues throughout load. Stack temperature reduced because of faster dissipation of heat through material.

You get *better roadability*—the lower center of gravity makes possible faster, safer traveling speeds to and from the job—also improved appearance.

You get *equalized load distribution*—which saves on chassis and tires, makes for easier handling, adds years to the life of your truck.

This is just *one* of dozens of exclusive Etnyre advantages. For the complete story, phone your nearby Etnyre Dealer or get in touch with us today!

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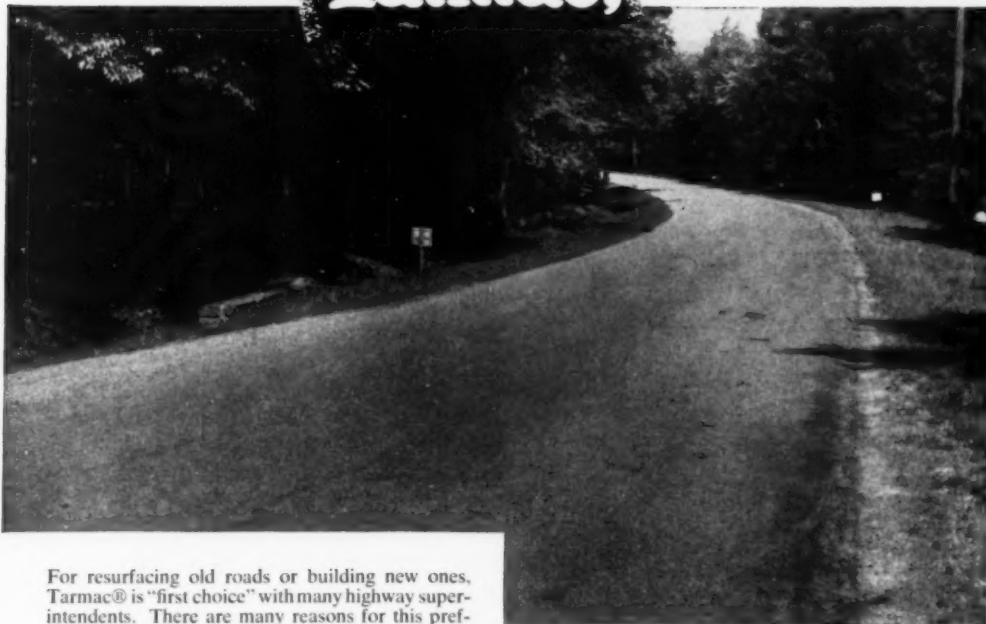
"Black-Topper"

BITUMINOUS DISTRIBUTORS



a durable road...
easy and economical to maintain

... IT'S **Tarmac**, OF COURSE!



For resurfacing old roads or building new ones, Tarmac® is "first choice" with many highway superintendents. There are many reasons for this preference. One of them is the fact that Tarmac speeds up construction work, and makes it easier to complete jobs on schedule. This faster job progress is made possible by these unusual properties of Tarmac:

PENETRATION. Tarmac penetrates quickly, thoroughly and uniformly into old or new, dry or moist roadbeds.

MIXING ABILITY. Tarmac mixes easily and speedily with all types of local aggregates.

ADHESION. Tarmac adheres quickly and firmly to the aggregate.

WETTING CAPACITY. Tarmac even "cuts through" dust or moisture films to coat the aggregate—and

does it quickly.

Besides speeding up construction work, Tarmac makes roads that, in the long run, cost less because they are tough, durable and long lasting. Further, these roads are easy and economical to maintain. Tarmac even resists the "stripping" action of water and the disintegrating action of oil and gasoline drippings.

Most important, Tarmac makes *quality* roads... roads that are smooth to ride on, *but hard to skid on*. Send for our free booklet, "Surfacing with Tarmac." It shows how you can construct and maintain all types of highway and airport surfacing.



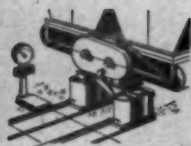
KOPPERS COMPANY, INC.

TAR PRODUCTS DIVISION, DEPT. 7327, PITTSBURGH 19, PA.

Tarmac MAKES BETTER ROADS

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BITUMINOUS MIXING PLANTS



Mix sampling and calibration facilities provided on B-G High Capacity Plants for mixing highest type 3-and-4 aggregate mixes. Convenient, accurate calibration by weight.

ACCURATE MIX CALIBRATION...BY WEIGHT ON A CONTINUOUS FLOW BASIS CONVENIENT FOR OPERATOR AND INSPECTOR!

Barber-Greene Bituminous Mixing Plants provide many control features not offered in any other type of plant. Here are a few of the provisions that help accomplish these advantages:

AGGREGATE GATES, when set to feed the correct amount of aggregate from each bin, may be locked in position.

OVERFLOW SPOUTS are provided on each aggregate bin for balancing aggregate by rejecting any excess of any size in the bins.

AUTOMATIC CUT-OUT stops plant operation in case of deficiency of any aggregate size.

FINES FEEDER for introducing mineral filler in correct proportion to total mix.

GRADATION UNIT SCREEN and bin design permit separation of aggregate into 2, 3 or 4 fractions to meet any specifications.

DUST COLLECTOR for use with any plant when it is necessary to conserve desirable fines in aggregate.

BY-PASS GATE for convenient calibration, inspection and sampling. Aggregate in each bin may be individually sampled without interference to plant operation and production.

BY-PASS GATE ahead of pug mill. Composite aggregate sample may be obtained for convenient testing without interfering with operation and production.

ACCURATE, POSITIVE-DISPLACEMENT bitumen metering pump with interlocked drive to aggregate feeders to guarantee unvarying proportion of bitumen to aggregate.

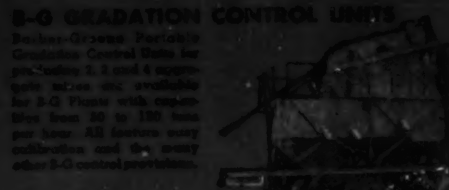
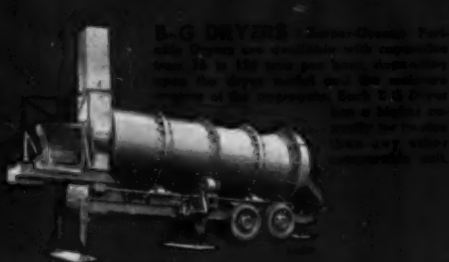
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FOR THE CAPACITY YOU NEED...
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SELECT FROM
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B-G BITUMINOUS PLANT ACCESSORIES

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send for authoritative B-G information

Complete files of performance data and explanatory literature on the size and type of Barber-Greene Mixing Plant which interests you are available at your request. As a preliminary to thorough discussion of your needs with Barber-Greene experts, send for this information. When writing, specify type of mixes, plant output, etc.



OR WRITE BARBER-GREENE COMPANY, AURORA, ILLINOIS, U. S. A.

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HOT BITUMEN FROM TANK-CARS

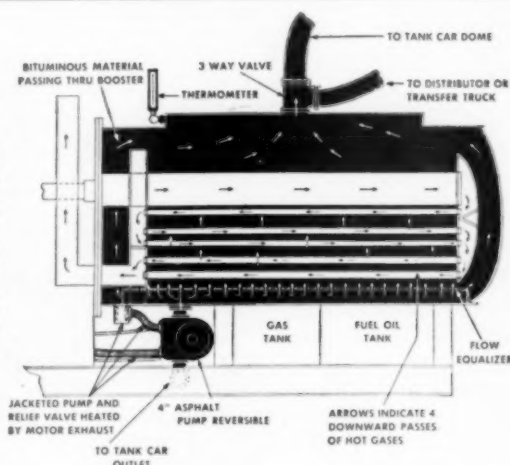
4 times as fast with



a Cleaver-Brooks PORTABLE PUMPING BOOSTER

The inside reason for fast operation:

Cleaver-Brooks Pumping Boosters pump, heat, and circulate bituminous material in one operation. Heating is provided directly, without use of steam, by pumping from tank-car (or storage tank) through the heating element of the Booster and back into tank-car. Entire contents of tank-car need not be heated as in one pass through the Booster, bituminous materials are heated to application temperatures and delivered to distributor, transfer truck, or storage tank; circulation of material while heating prevents separation and assures uniform application. No water or steam required for operation.



Built by the pioneers and originators of pumping boosters:

Cleaver-Brooks Pumping Boosters are available in two sizes (No. 1 heats 10,000 gal. car 35° — 45°F. per hour; No. 2 heats 10,000 gal. car 55° to 65°F., per hour); both sizes obtainable skid-mounted or trailer mounted. Cleaver-Brooks are pioneers and originators of pumping boosters and tank-car heaters — have designed and built this equipment for more than 20 years — many original models are still in action — rendering efficient service.

Get complete information — send for bulletin

CLEAVER-BROOKS COMPANY
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Send for bulletin "Cleaver-Brooks Pumping Boosters" for complete information and specifications.

BUILT WITH THE FAMED
FOUR-PASS HIGH EFFICIENCY DESIGN OF

Cleaver-Brooks

STEAM BOILERS

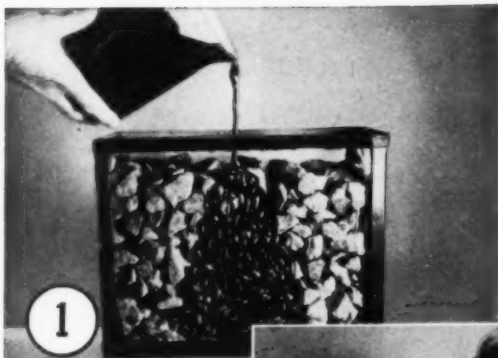


Your 3 Basic Paving Problems

Solved **BETTER** by

Bitumuls
REG. U. S. PAT. OFF.

Only BITUMULS can perform these three functions so efficiently and at such low cost. (There are other reasons, too, but these three come first.)



1
It PENETRATES—
 uniformly and deeply—without heating—through closely interlocked stone, damp or dry. In macadam construction, this means **STABILITY** because BITUMULS tacky asphalt coatings leave the stone in frictional contact.



2
It COATS DAMP NATIVE MATERIALS—
 Only BITUMULS mixes easily and uniformly with damp, dense materials. Nothing else so efficiently treats low-cost sands and native aggregates—and gives early pavement stability with year-round high bearing value.



3
It SEALS—
 with precision—the **RIGHT** amount at the **RIGHT** place. This ease of precise cold application gives unsurpassed uniform, non-skid surface treatments with maximum retention of cover stone.

Whatever your paving needs, they can be filled by a correct BITUMULS specification that has already proved effective many times elsewhere. Our service engineers, skilled in the needs of your area, are ready to help **YOU**. Wire, phone or write our office nearest you.



Ask for these **FREE** booklets—data, tables, specifications.

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Ask for our BITUMULS BOOKLETS. They are factual, illustrated, and helpful—a valuable addition to your engineering library.

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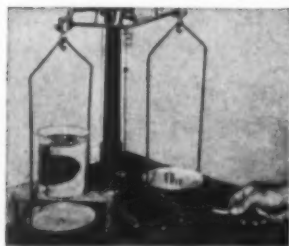
How absorptive will compacted subgrade soil be?

How thick should base course and wearing course be?

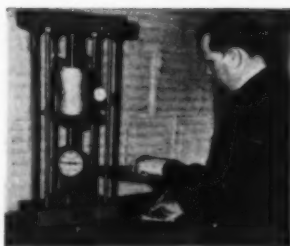
Will local aggregate make a satisfactory base course material?

What will spring thaws do to the paving?

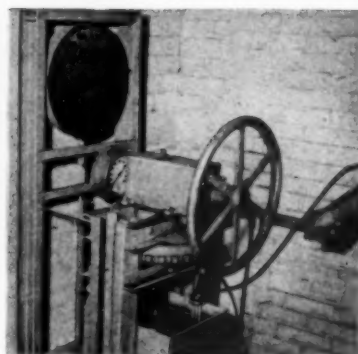
For better roads...let us "build" them first...in Ohio Oil's Modern Laboratory



Will local aggregate make a proper asphaltic mix? Specific gravity and voids-ratio analysis are made on a 2-inch asphalt mix briquette.



How will subsoil stand up? A soaked soil briquette is tested in a California Bearing Ratio Stability Machine to find out.



How strong will the paving mixture be? A Hubbard-Fields Stability Machine determines the shear strength of the compacted mix.

Put Ohio Oil's top engineering staff to work on your problems . . . without cost or obligation

TO INSURE BETTER ROADS IN 1951, you need the answers to plenty of engineering problems. And you can *get* these answers by having Ohio Oil's skilled technicians "build" your roads and reproduce your local conditions . . . in a laboratory completely staffed and equipped to give the best service to our customers. Write, wire, or phone for help on *your* problem, today.

This 15-state area is served by Ohio Oil—
a major source of asphalt for 26 years



The OHIO OIL Company • Asphalt Department

FINDLAY, OHIO • LOVELL, WYOMING • Producers of Petroleum since 1887





★ Scenes such as this eloquently depict the frost damage suffered last spring on Ohio's roads. Highway 6 across the state between U.S. 30 and U.S. 20 suffered the more because of heavy trucking on roadbeds not originally designed for such traffic.

Contractors Help Repair Ohio's Spring Road Damage in

\$3 Million "Quickie" Program

Under special ruling, jobs awarded as Purchase Orders without plan sheets, in high-speed effort to augment maintenance forces. Four types of bituminous placement used.

FOLLOWING the severest winter and spring road damage in Ohio's history, the Ohio department of highways took emergency steps to erase the worst of the destruction. Highlight of this effort was the cooperation of the state's highway contractors, and the dispatch with which they took on and handled some 3 million dollars worth of unforeseen work.

Under a special ruling by the Ohio state board of control, the legally required procedure of awarding contracts on 30 days' notice through the highway department engineer of sales, was dispensed with. Instead, the jobs were posted only 10 days, and awarded as purchase orders, without plans and with only brief procedure outlines and material specifications.

This program, added to the large force-account maintenance program, brought to around \$12 million the cost of spring road maintenance and repair work in Ohio, contrasted with a normal \$1½ million. Following a bad winter which required \$4 million in snow and ice control work, or double

normal, this effort has dug seriously into state road funds in Ohio, where a record-breaking \$56 million state road construction program had been planned. About 375 miles of state primary and secondary roads were included in the "Quickie" contract program, the individual sections ranging from 0.5 to 26 miles in length. There were 185 separate contracts.

Intermittent or patchwork methods were specified, to be performed at locations as directed by the engineer, rather than a general or complete application over the entire section. As a result of thorough advance planning and proper briefing of the contractors, this type of operation has been handled with good efficiency. Most of the contract work was completed by late June, and the Ohio traveling public rescued from a rather serious and widespread emergency.

Trouble Began Early

The picture began to look bad for Ohio road conditions by midwinter, as a result of the once-in-a-lifetime bliz-

zard late in November, followed by sub-zero weather alternating with winter thaws and rains. The break-up began late in February, and reached an alarming state by March, when many roads carrying heavy traffic developed frost boils and pot-holes, or ravelled and generally disintegrated. While in general the roads that suffered severe damage were older, inadequately constructed ones, some more recently built sections also showed distress. A survey indicated an estimated \$12,000,000 to \$15,000,000 in ultimate roadbed damage.

During February roads were extensively posted, under a state law which permits the highway department to limit gross axle loads during periods of excessive moisture or melting frost. Many roads remained posted until April 20, May 1 or even May 10 in the northern part of state. Enforcement, however, proved almost impossible despite the effort of the all too few weighing station and mobile loadometer crews.

By March 15 state highway maintenance leaders realized that labor shortages would hinder an all-out repair program by state forces, since state highway labor rates are below the rates offered by industry and the work staff could not be properly



Drag Patching—Hy. 161 Cunningham & Wise, Contractors

★ This contractor, of Granville, O., employed a Barber-Greene plant consisting of a No. 846 mixing plant, No. 363 belt conveyor and No. 358 under-car unloading unit to produce cold mix for one-course machine-placed random patching. Project length 6.72 miles of Hy. 161 farm-to-market road in Licking County. B-G finisher and Galion tandem roller. Note signs for one-lane flag controlled traffic through job

road sections ready for the surfacing operations of the contractors.

Four Job Types

The contract maintenance work fell generally into four classes, briefly outlined as follows:

(1) Drag patching, which usually consisted of a bituminous prime and tack coat, Ohio specification T-30, followed by a road mix surface course, T-32. A typical job called for applying .10 gal. per sq. yd. of RC-3 or RC-2 or similar bituminous material with sand cover, to cover spots or areas designated by the engineer; followed by a road mix or travel plant course of material of varying character, as deemed best for the particular location. RC-2 or RC-3 or other suitable bituminous material was mixed with acceptable crushed aggregates, the liquid asphalt ranging from .58 to .70 gal. and the stone from 66 to 86 lb. per

manned. Equipment on hand also was insufficient to do the triple-sized job at hand.

Division offices of the highway department compiled lists of repair sections and a priority program was adopted. Then following approval to award contracts by purchase order, an initial letting was held April 23. About \$2,000,000 worth of jobs were taken up and bidding was spirited. On May 3 an additional \$1,000,000 of jobs were awarded and subsequently a third letting was held.

A feature of this program was the cooperation between highway officials and the Ohio Contractors Association, whose members agreed to tackle this substantial volume of unforeseen work at a time when they were either preparing bids on other jobs or getting started on work already awarded.

Some of the contractors felt that this was a chance to render a public service, and also to further demonstrate the feasibility of performing repair work by contract, while others were frankly glad to get the work.

While the details of the "quickie" program were being worked out, the state highway maintenance forces worked at top speed, repairing base, correcting drainage, placing hold patches, and otherwise getting the

★ A 1-layer cold-mix machine-laid section, immediately after completion by contract—one of several hundred sections of primary and secondary state roads restored in Ohio during May and June



sq. yd., with suitable amounts of choke stone rolled in.

(2) Seal coat or single surface treatment. This type of correction was selected for roadway areas where the base condition was good but the surface had "alligatored" or developed a fine crack pattern, showing need for addition of new bitumen. An RT-2 or RT-3 prime and a seal with RT-8, RT-9 or RT-10 were included in a typical job, along with 20 lb. per sq. yd. of cover stone. The existing surface was sometimes scarified, pulverized and reshaped prior to these applications depending on the road condition.

(3) Reconditioning, with addition of new aggregate. This class of work, required for sections where base reinforcement was seen to be advisable, included scarifying, pulverizing and reshaping of the old roadway, thorough mixing with mechanical rotary type mixers or travel plant, spreading and compacting at optimum moisture, compaction in 4 in. compacted layers being specified. A prime coat and a surface treatment then followed. Again, this work was not continuous,

but was performed at intermittent locations, as directed by the engineer.

Single Hot Mix Layer

(4) Hot mixed asphaltic concrete, or Ohio specification T-35 high-type mix, was employed on some of the most important and heavily traveled roads where this type of surface was justified and the base conditions were good enough to warrant investment in a more permanent overlay. A single 1 to 1½ in. layer of T-35 was machine laid along sections indicated by the engineer. A tack coat preceded this application.

Much of the betterment work involved in the above operations could be considered an advance phase of more general resurfacing scheduled to be placed sooner or later by regular construction contract, as needed or as soon as funds are available. Other projects were designed principally to meet the immediate emergency. Any or all three phases of force-account spring maintenance, contract repair work, and contract resurfacing were

being scheduled as the district engineer deems best for a given situation.

The emergency program was slowed considerably by the shortage of aggregates that developed here and there at the height of the work. Also by a tapering off of interest by the contractors in the later offerings; in some instances the later jobs had to be re-advertised or were awarded to contractors who found it difficult to meet the June 1 deadline.

The afore described program, combined with the regular construction is expected to result in the highest volume of bituminous road work in Ohio's history this year. Hot-mix resurfacing contracts are expected to be totaling 475 miles of equivalent 20-ft. pavement.

T. J. Kauer is the Director of Ohio's Highway Department and the maintenance contract program herein described was carried out under the direction of C. W. McCaughey, Chief Engineer of the Bureau of Maintenance and Repair, in cooperation with the department's 12 division offices.

Another Typical Ohio Contract Repair Project

★ The Shelly Co., of Thornville, O., had contracts covering various sections of road near their home community. Intermittent areas were treated as follows: (1) On some sections (as pictured) seal and chips placed with various equipment, including Galion stone spreader, Galion roller, International KB-7 trucks with Hercules bodies. By working 8-hour day with no lunch stop, crew laid 498 tons in typical day, despite frequent jumps. (2) On other sections, cold mixed asphaltic concrete consisting of MC-4 and MC-6 blended and 100% crushed limestone, mixed and applied with a Hetherington & Berner motopaver. Diamond T truck in scene. Thickness 1 in. or more or about 80 lb. per sq. yd., depending on engineer's judgment; intermittently applied to designated areas. Buffalo-Springfield roller. Around 46,000 sq. yd. in this job. M. D. Brandon, foreman.

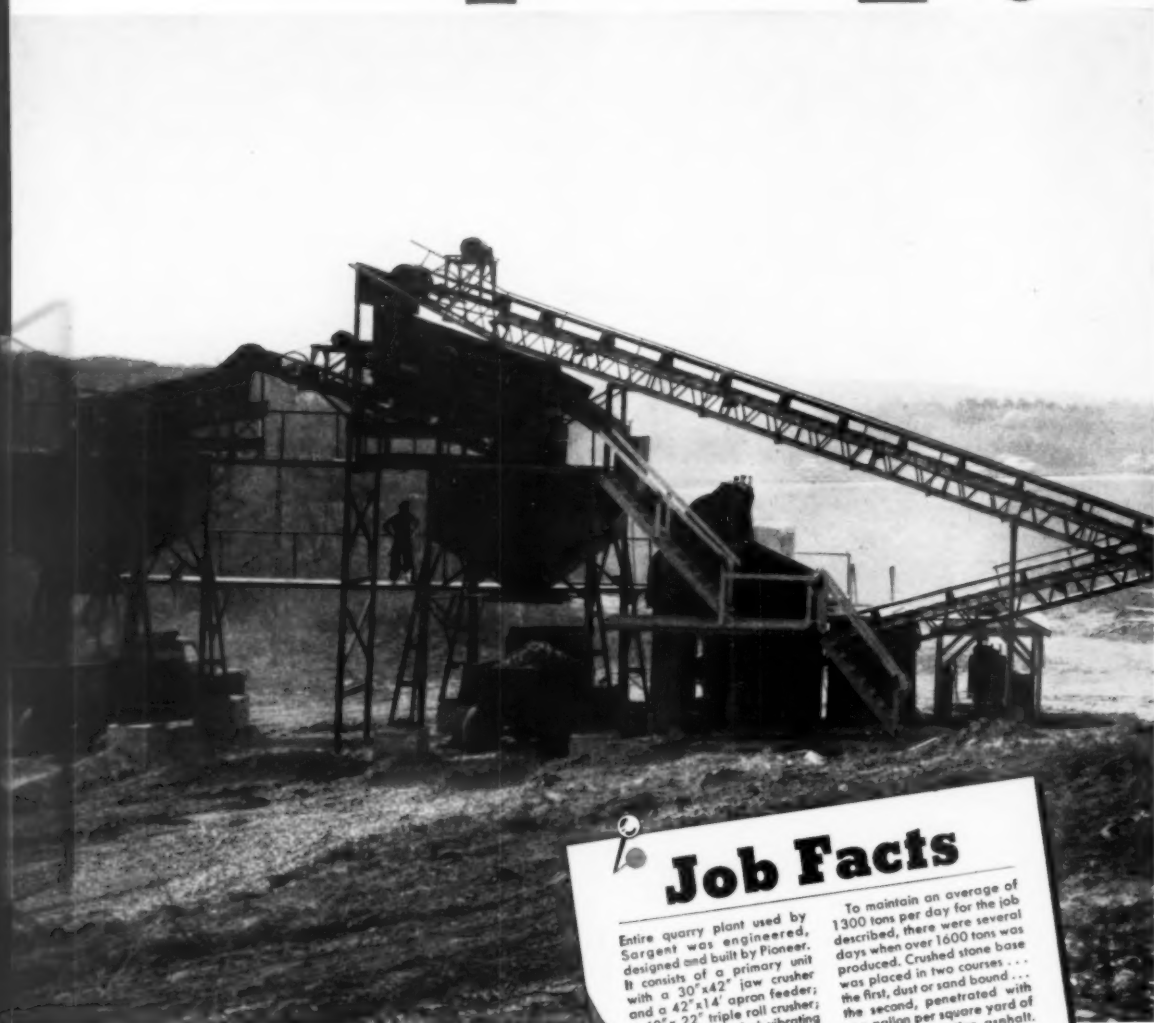


69



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Job Facts

Entire quarry plant used by Sargent was engineered, designed and built by Pioneer. It consists of a primary unit with a 30"x42" jaw crusher; with a 42"x14' apron feeder; and a 40"x22" triple roll vibrating screen; two 20 yard bins and 95' of conveyor.

To maintain an average of 1300 tons per day for the job described, there were several days when over 1600 tons was produced. Crushed stone base was placed in two courses... the first, dust or sand bound with the second, penetrated with one gallon per square yard of 85-100 penetration asphalt.

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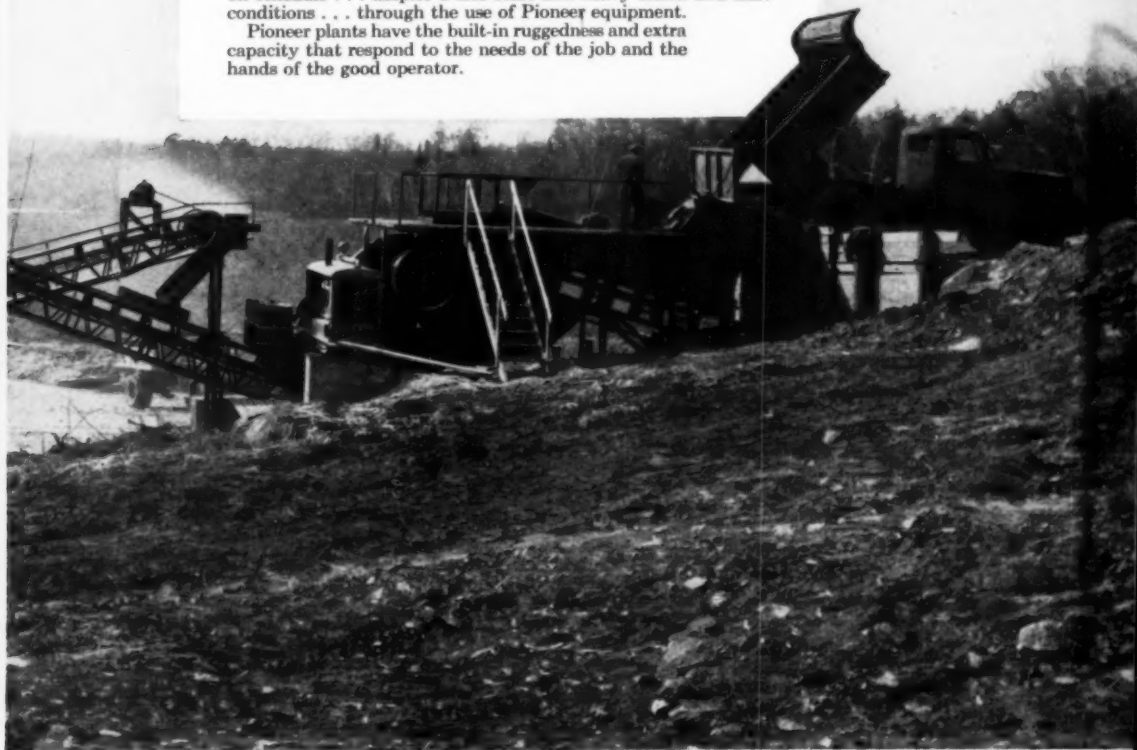
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Helps contractor make up for late start on Vassalboro-Winslow Project

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★ Completed pavement, U. S. 85 on edge of Raton, N. Mex.

Heavily Traveled New Mexico Highway Repaved With Hot-Mix Asphaltic Concrete

Notes on 7-mile project on U. S. 85 entering Raton Pass, New Mexico, W. T. Bookout Construction Co., Contractors

By Ira B. Miller

Project Engineer,
New Mexico Highway Department

and J. D. Reese

The Texas Company

THE project here described covered 6.98 miles of U. S. 85 immediately south of Raton, in northeastern New Mexico. Completed in 1950, it represents new practices designed to equip New Mexico's more heavily traveled highways for present-day weights and volume of traffic. The job is notably in contrast with asphalt oil road-mix methods, used heretofore by the state as a successful means of providing a large mileage of surfaces quickly and with limited funds.

As a preliminary to paving, this reconstruction project included 309,000 cu. yd. of unclassified excavation, and 105,000 tons of ballast (spread 6 to 12 in. thick, depending on soil classification). A 3-in. leveling course was placed over all. Soil in place was compacted with pneumatic-tired and sheepfoot rollers.

The original contract specifications called for building the top 1 in. depth of this leveling course as a road-mixed asphalt base or processed prime, using RC-2. This base is 4 ft. wider on each side than the subsequent surface course. By the time the contractor got around to this part of the work,

however, road-mixing satisfactorily was almost impossible due to delays from the phenomenally wet weather and attendant cool temperatures of the 1950 season. Engineer approval was given to running material for this 1-in. course through the hot-mix plant set up for the surface course.

Moisture Improved Bond

The RC-2 material was already on hand and had to be used and accordingly some trouble was experienced in drying the aggregate because of the low temperature requirements of the RC-2. A further difficulty encountered with this switch-over to hot-mix was the matter of a satisfactory bond with

the leveling course, since under the original plan, calling for road mixing, no prime was necessary and none had been set up in the contract.

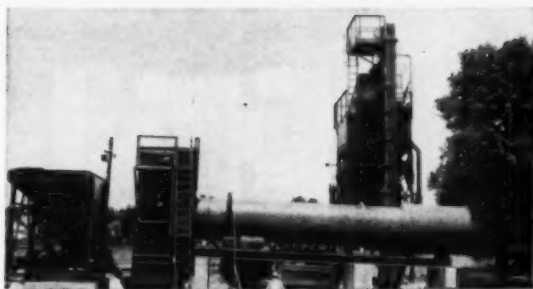
The solution by the project engineer was an interesting feature of this stage. After some experimentation, it was found that a satisfactory bond could be made with the leveling course if the upper part of this course held a small percentage of moisture. This desired moisture content was found to be near 3.5% and, while there could be no free water, the top one inch had to be moist enough to furnish a dust free-surface to receive the oil mix material. This phase of operations seemed to show that oil and water do have an affinity for each other under proper conditions.

The hot-mix asphaltic concrete sur-
(Continued on page 76)



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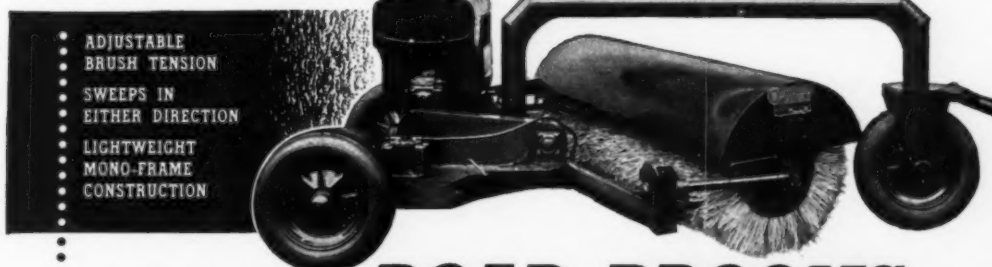
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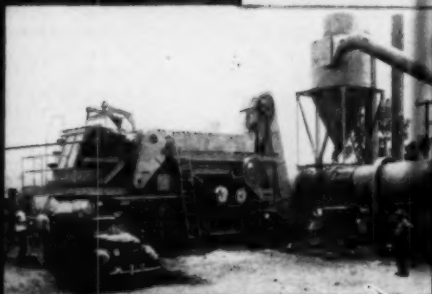
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Photo by Irving Ballman

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BITUMINOUS ROADS AND STREETS

(Continued from page 72)

face course was placed 24 ft. wide for about five miles on the south end of the job. At the north end, extending 9,000 ft., the design included a boulevard section, with roadways on either side averaging 24 ft. wide but with additional lanes for deceleration and acceleration at a number of the cross-over inter-sections. This boulevard section is lighted with mercury vapor lamps on high standards of graceful design within the city of Raton. Concrete curbs, designed for easy drive-over with 12 in. top and bottom radii, enclose a 16 to 30 ft. median strip.

Heavier Grade Used

The asphalt cement used in the hot-mix surface course was of 85-100 penetration which is unusual for this western country, where softer asphalts are the rule. This course was built to a compacted thickness of 1½ in. securing a tight composition of uniform texture. Following is a typical aggregate grading:

Opening	¾"	½"	¾"	¾"	¾"	¾"	¾"	¾"
% passing	100	93.6	75.2	50.8	41.9	25.7	13.1	7.4

The asphalt percentage of the total mix was set at 6.3.

The Marshall method and equipment were used by the bituminous engineer on the project for field design and control, subject to the approval of the state highway laboratory. Average stability obtained was 1,500 and the flow was 15. Samples taken by means of rings laid in the pavement were checked, and rolling was carried on until about 96-97% of theoretical density developed.

A new Madsen 4-bin, 3,000-lb. batch plant was set up for the job. It was powered by two diesel units and a Clayton steam generating unit furnished steam for the burner on the drum, for heating the storage, for



★ On W. T. Bookout Construction Company's U. S. 85 project, one of several projects built in 1950 under New Mexico's new specifications. Adnum paver

operating the ram on the mixer gate, and the jacket on the mixer. A generator set furnished power for pumps and lights. The pavement was laid by

an Adnum paver operated at its slowest speed and plant batches were set at 2,000 lb. to match.

Compaction was performed with two 10-ton steel rollers. Aggregate was produced locally by the contractor with a Cedarapids crushing and screening plant.

Acknowledgments

The project was under the direction of Ira B. Miller, project engineer, with C. W. Johnson assisting as bituminous engineer on the hot-mix work. C. O. Erwin is district engineer for the New Mexico Highway department. For the contractor, W. T. Bookout Construction Company of Las Vegas, Ray Curtis had charge as superintendent, with Carl Willhoite as office manager.

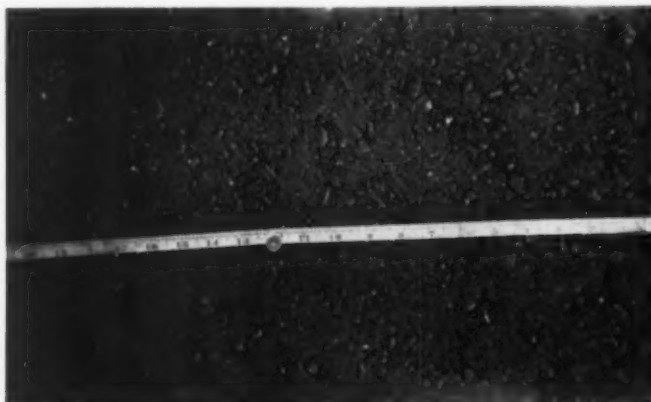
Asphalt Research in California

The asphaltic-mix laboratory of the University of California Institute of Transportation and Traffic Engineering, at Berkeley, is engaged in investigations in soil stabilization and in the design of asphaltic-mix pavements. According to B. A. Vallegria in the Institute's *Quarterly Bulletin* the four principal investigations are as follows.

Soil stabilization with asphalt. As a first step, the effect of different climatic conditions on time of curing is being studied for eight different soils combined with a medium-curing liquid asphalt. Factors to be evaluated include the effects of sun, wind, moisture, and temperature.

The preparation and testing of asphaltic-mix specimens are still being studied as part of the Triaxial Institute Co-operate Research Program. Participating agencies prepare specimens and send them to the laboratories of the other participants for testing. By this procedure it is expected that the Triaxial group will be able to identify the differences, if any, between specimens prepared in the different laboratories and between test results obtained in the different laboratories on similar specimens. Other participants are Shell Oil Co., California Research Corporation, California Division of Highways, and U. S. Forest Service.

Methods and devices for forming laboratory test specimens are the subject of a separate investigation. One objective is the development of a simple kneading-type compactor for field use. Test specimens formed by various methods and with various devices have been compared by the Hveem stabilometer. This work was reported



★ Close-up of completed asphaltic concrete wearing surface; U. S. 85 job

in a paper to the Assoc. of Asphalt Paving Technologists in February. Additional devices and methods remain to be studied, as well as the effect of varying sample size.

Durability of asphalts is the subject of a fourth investigation. Asphalts frequently fail to perform satisfactorily as a binder in pavements as a result of hardening with exposure and time. Equipment has been prepared for explorations into the causes of hardening. From the data so obtained it may be possible to develop criteria for suitable performance.

Asphalt Institute Appoints Griffith Research Chief

Bernard E. Gray, President of The Asphalt Institute, has announced the appointment of John M. Griffith, as Engineer of Research, with headquarters at the New York Office. Mr. Griffith succeeds to the post until recently held by Prevost Hubbard, retired, as head of the Institute Laboratory and field research.

Mr. Griffith received the degree of Bachelor of Science, Civil Engineering, from the University of Michigan. His background of training and experience includes first, work with the U.S. Coast and Geodetic Survey in the Mississippi State Highway Department on general highway planning. In Michigan in 1938 and 1939 he served as Office Engineer in the City Engineer's Office at Ann Arbor, and then for two years with Professor W. S. Housel in consulting work on soil mechanics and foundations at the University of Michigan. From 1941 to 1943 he was employed as structural designer in the Chief Engineer's Office of the New York Central Railroad in Chicago.

For the past eight years Mr. Griffith has been with the Flexible Pavement Branch of the Waterways Experiment Station at Vicksburg. This is a research branch of the U.S. Corps of Engineers operating directly under the Chief of Engineers, Department of the Army. Starting as a project engineer in charge of field research on soils and pavement projects, Mr. Griffith was promoted in November 1944 to Chief of General Investigation Section, handling all field research, testing, and certain analytical studies in the office; and was reassigned in October 1947 to Chief of Bituminous and Chemical Section, handling all laboratory research and a number of special projects of the Branch.

Mr. Griffith is an Associate Member, American Society Civil Engineers; Member, Association of Asphalt Paving Technologists; Associate

in Highway Research Board; and Registered Professional Engineer (Civil) in Michigan.

Patrols Compared With Maintenance Crews

By John C. Burnham

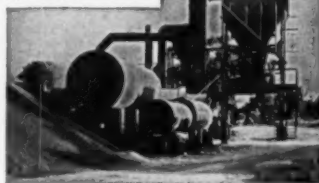
Assistant to Chief Engineer, Maine State Highway Commission, Augusta

(Published in "The Trail," official magazine of the Maine Good Roads Association.)

The Maintenance division of the State Highway Department, in seeking ways to reduce the cost of doing work, has in a few localities organized crews to take over the mileage

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formerly repaired by several patrolmen and their helpers.

In general one of the new crews is expected to handle the maintenance work upon about 125 miles of highways. That mileage would be the equivalent or a little more than now handled by five average patrol crews.

Taking one of the crews now in operation as a sample it is found it consists of 1 foreman, 3 truck drivers, 5 laborers, 1 pickup truck and 3 two yard dump trucks. The combined salary and truck rental for this crew amounts to \$10.55 per hour. It replaces a crew of 5 patrolmen, 13 helpers and 5 trucks which were paid a combined cost of \$18.41 per hour. It can readily be seen there is a saving per hour of \$7.86 which would be good business if the new crew can produce as much work as the several small crews replaced.

Only a few such crews will be put into operation pending a careful analysis of results. If after a fair trial results prove the advantage of the larger crews then they will replace the smaller crews throughout the state.

The new crews are expected to be more efficient because the proper number of laborers will be available for loading truck or for other jobs requiring several men.

In comparison to the larger crews the patrol crew usually consisted of the truck, a patrolman and one or two or possibly 3 helpers. As the crew depended upon the patrol trucks for transportation the entire crew usually worked at the same point and upon the same task. Rarely does a patrolman put his helper to work upon one job and he drive on to some other point where he would find work to do.

It has been remarked time and time again that when a patrolman has more than one helper he then becomes only a foreman and truck driver. It has also been said that a patrolman working alone works full time, if he has one helper he works part time but if he has two or three helpers he becomes a non-working foreman.

There is no question but there are some grounds for criticism of highway patrol crews but on the other hand there are many hard working, honest patrolmen who give a good day's work and are earning their wages. These good-working patrolmen will be the ones who will form the larger maintenance crews and there is no reason why one of them should not be the foreman. The poor workers will be laid off and it will not be surprising if it is found that the ones who voice the loudest objections to a change will be those who will not be needed.

BPR Defines Construction Permit Requirements

In order to avoid any possible confusion regarding the agency which should handle applications pertaining to the commencement of highway construction projects, the Bureau of Public Roads has pointed out that its authority (by delegation of the National Production Authority and Secretary of Commerce Sawyer) extends to all the actual construction, maintenance and operation of the highways themselves, including markers and other traffic control facilities.

The general criteria which will be the basis for the issuance of road construction permits are: (1) The project is construction for the account of the Department of Defense, the Atomic Energy Commission, or the National Advisory Committee for Aeronautics; (2) The project furthers the defense effort by providing facilities of certain specific types; and (3) It is essential to maintenance of public health, safety, or welfare.

Application for authority to commence construction on a highway project should be directed to the District Engineer of the BPR in the state in which the project is located. When an agency other than the state highway department is in charge of the project, the application should be channeled through the state highway department for recommendations before being presented to the Bureau of Public Roads.

A permit to construct may be issued if the project is in one or more of the following specific classes of highways:

1. A legally certified access road.
2. A section of a route on the Interstate Highway System, urban or rural.
3. A section or a route which is inadequate and unsafe for the traffic volume and which cannot be kept in service without excessive costs including highway maintenance, vehicle depreciation and vehicle operation over a 10-year period. This requirement does not preclude a relocation and new alignment if necessary to provide adequate rights-of-way for more efficient operation.

Special cases and those involving commitments for large expenditures of funds and extensive use of critical materials and labor should be forwarded to the Washington office of BPR for consideration. Projects which require less than 25 tons of steel or are essentially maintenance in character do not require a permit to construct. However, any steel or other critical material required will be charged to a state's given allotment.

All proposed projects will use types of construction and design standards which require the minimum of critical materials.

Federal-aid projects which are subsequently submitted by the State for program approval should meet the criteria to the end that program approval will carry a commitment for approval of construction if acceptable bids are received.

On subsequent Federal-aid projects, applications for commencement of construction should be submitted to the District Engineer by the State with the plans, specifications and estimate for each project. If satisfactory, the formal letter authorizing commencement of construction should be issued by the District Engineer at the time the project is authorized for advertising.

Roadside Islands Built as Safety Aid

In the interest of both traffic safety and roadside beautification, the Kansas Highway Commission Division 1 has begun a program of island construction at suburban cafes and other roadside establishments. This work is being done near Topeka. The enclosed areas will make it possible for the motorist to differentiate between private entrances and state land. The belief is that channelization of large roadside expanses will help direct

traffic more positively in entering or leaving the main roadway, just as channelization helps eliminate driver confusion and reduce accidents at intersections.

Pictured here is a typical oval or circle, selected for landscaping with the property owner's permission. Since such areas are usually surfaced with stone or gravel, and well compacted, post hole digging was something of a problem. The power auger attachment on a small tractor made rapid work of post setting.

Perkins New Arizona State Engineer

R. C. Perkins, heretofore deputy state engineer of Arizona, has been appointed state highway engineer. He succeeds W. C. Lefebvre, who resigned to accept the appointment of postmaster for the city of Phoenix, Ariz.

Correction

The article "Detroit's Assessment Street Program" appearing in May ROADS AND STREETS contained a typographical error, which we would like to correct. G. R. Thompson, City Engineer of Detroit, calls attention to the fact that we gave the cost of the 75 miles of paving done in 1949 at \$5,355,367, which should read \$71,500 per mile rather than \$871,500 as stated.



★ Posts set for an island along entrance highway near Topeka. The enclosure is to be grassed or planted with flowers. Landscape foreman Floyd Infield and maintenance foreman Howard Manley watching operation of power posthole auger

Control of Hot-Mix Asphaltic Concrete

In non-technical language the author reviews principles of asphalt pavement design and discusses the more important factors essential to a good quality job.

By J. Rogers Martin

Research Professor, School of Civil Engineering, Oklahoma Institute of Technology, Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma

THE first hot-mix asphalt pavement using petroleum asphalt was laid on Pennsylvania Avenue in Washington, D.C., in 1900. This sheet asphalt pavement was controlled strictly by trial and error, and incidentally, was a complete failure because the asphalt content was too high. From this beginning, more and more hot-mix pavements were laid with a constant improvement in the finished product. As time progressed, engineers, still working largely by trial and error, learned by hard experience the importance of asphalt content, of grading, and many other factors which contributed toward a successful pavement.

These early engineers were artists. Many of them learned to build good asphalt pavements by the same method that grandma baked a cake. Her units of measure were dashes, dabs, and pinches and she could bake a wonderful cake, but when she tried to tell daughter how to do it, the cake usually had to be thrown to the hogs. So it was with these old veteran asphalt men.

In the '20's a new breed began to emerge in the asphalt paving industry known as the laboratory research man. He followed the veteran around, observing his methods and analyzing his pavements with the objective of finding the keys and establishing rules for building a good pavement so that it would not be necessary for a man to have fifty years' experience in order to place one which was satisfactory. In this he was largely successful. Guiding principles were discovered and put into use through tests and specification requirements. They were called controls. Now from where did these controls come? They were not the result of so-called research men sitting at a desk and determining out of thin air just what would have to be done to make a good pavement. They were merely the reflection of the skill of the veterans in the field reduced to

definite figures and numbers. As a matter of fact, a statement of the principles of control and design could aptly be considered as a summary report of fifty years of field research in building hot-mix asphalt pavements.

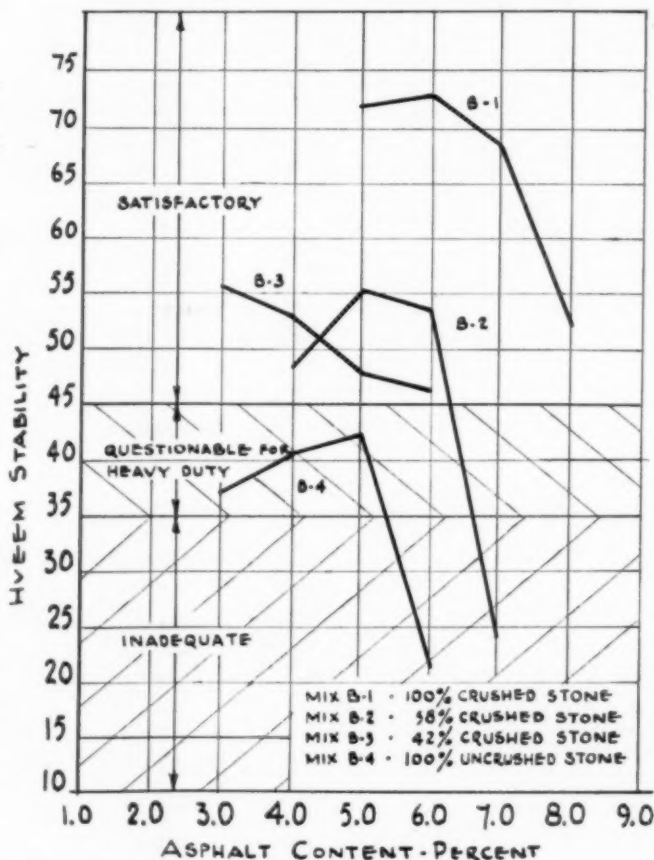
Principles Summarized

Now let us see what these principles are. Inasmuch as control is merely the design worked in reverse, let us consider the guiding principles in

design which have now been agreed upon by the major portion of the engineers in this country.

(1). The aggregate must be reasonably well graded. For instance, the commonly used mixes for surface course must have sizes all the way from about $\frac{1}{8}$ inch down to dust.

(2). Finished pavements must have a certain amount of air included in the mix in the form of air pockets or voids. Experience has shown that the voids should not exist in an amount of less than 2 percent nor more than about 6 percent. So taking the middle course, the designer sets the voids at 4 percent or, stated in another manner, he sets the mix at 96 percent



★ Figure 1. Effect of type of aggregate on stability

density. This is accomplished by making up several mixes in the laboratory with varying percents of asphalt, compacting them as they will be compacted on the road and then selecting the asphalt content which will give 96% density. Thus, the optimum asphalt content of the mix is established.

(3). Having decided on the exact grading and the exact asphalt content to be used, it is now necessary that the compacted mix be tested by some stability method to determine whether or not it will take the traffic to which it will be subjected.

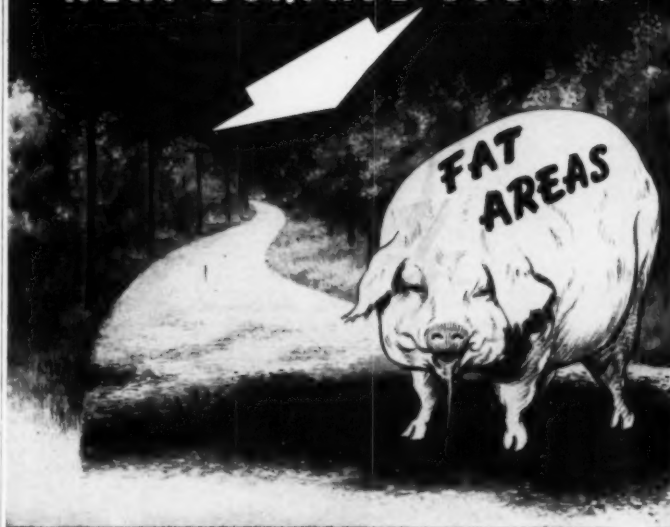
(4). The use of extremely hard asphalts is avoided because the softer asphalts have a longer life. The old concept that the asphalt had to be as hard as a brick in order to obtain the necessary stability no longer prevails. It is now known that a much more important consideration in obtaining a strong stable pavement is the kind of aggregate employed in the mix. An illustration of this may be seen in Figure 1.

Figure 1 gives the design results of four different mixes. Each curve represents 4 different asphalt contents plotted against the percent Hveem stability. Any specimen, the results of which falls above the bottom hatched portion will have satisfactory stability for most purposes. In case of pavements subjected to heavy, frequently-stopping traffic, specifications usually require a minimum of 45 so that we may say that those above the second hatched portion are completely satisfactory for all pavements. Now each of these mixes has exactly the same grading but different types of stone were used in each case. Curve B-1 is 100 percent crushed limestone, B-2 is 59 percent crushed limestone and 42 percent sand. Curve B-3 is 42 percent limestone screenings and 58 percent uncrushed gravel. B-4 has no crushed stone, consisting entirely of gravel and sand. Now you will observe that the stability of the mixes represented by each curve drops progressively lower as the percent of crushed stone is decreased. Here is an important factor in any design. It would be an easy matter for the engineer to design a mix in accordance with the curve in B-1, 100 percent limestone. There would be little fear of obtaining an unstable mix and he could "rest at nights." Now what about the contractor's standpoint on these mixes.

Cost vs. Stability

As a general rule, we can say that stability costs money because the price of the aggregates usually decreases as the stability decreases. For instance, on this particular set of designs we

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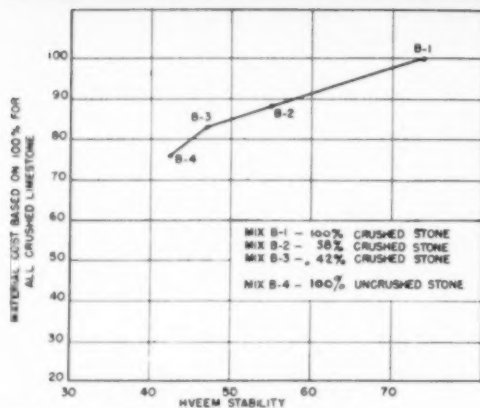
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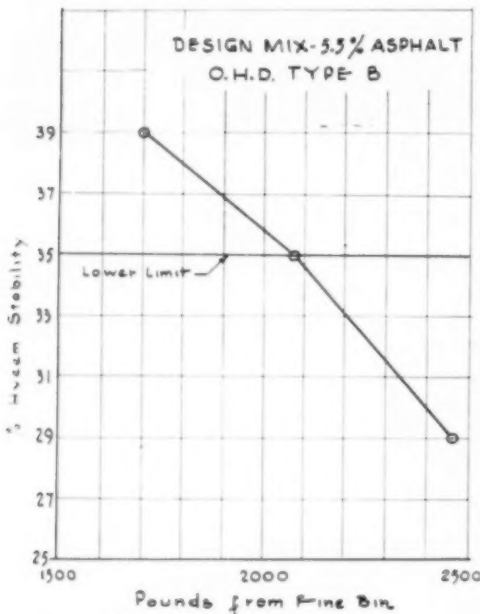
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BITUMINOUS ROADS AND STREETS



★ Figure 2. Relation of material cost to Hveem stability

★ Figure 3 (left): Aggregate portions contain: curve 1, 100% crushed limestone; curve 2, 60% crushed limestone and 40% sand; curve 3, 10% crushed limestone, 40% uncrushed gravel and 50% sand



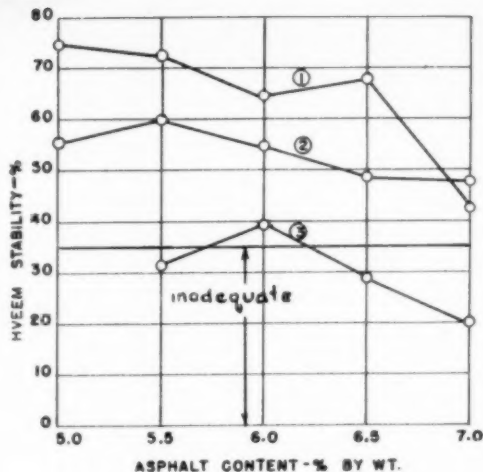
★ Figure 5. Effect of grading on stability

have plotted material cost based on 100 percent for the all-crushed mix against the Hveem stability. This is shown in Figure 2. The use of mix B-2 will save 12 percent on the material cost over that for mix B-1. Mix B-3 will effect a savings of 17 percent and B-4 a savings of 24 percent.

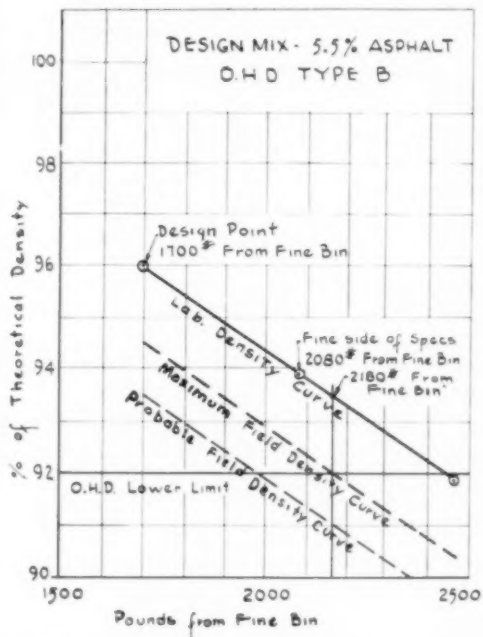
The curves in Figure 1 are very typical of the trend reflected in mixes with varying amounts of crushed

stone, but it should be pointed out that the mix containing no crushed stone showed a little higher stability than can normally be expected. Figure 3 represents a series of curves which are more typical of those ordinarily obtained.

Curve (2), Figure 3, is fairly representative of many of the mixes being used in Oklahoma employing crushed stone and sand. Also, curve (3) is fair-



★ Figure 4. Effect of grading or percent density



★ Figure 4. Effect of grading or percent density

ly typical of what is to be expected with little or no crushed stone in the mix.

The cost relation on these mixes are similar to those shown in the last figure so that curve (3) represents the cheapest mix by far. However, it is obvious from this curve that this mix is unsatisfactory due to the narrow range of asphalt content over which it will have 35 percent stability or

more. This statement applies to the accuracy of control which we are actually able to obtain in the field as of 1950. At some future date when the contractor and engineer working together have perfected control to a fine point, such a mix can be used safely with a resultant savings in cost.

Now let us consider plant control on the job. Actually plant control is nothing more than a matter of seeing that the mix is made in accordance with the established design. Minimum tests are extraction, grading and density tests. The extraction gives the asphalt content and the grading.

Importance of Gradation

I believe it is unnecessary to point out here the importance of holding the asphalt content within the design limits because every engineer and contractor is familiar with the fact that an excess of asphalt will invariably result in shoring, bleeding, or rutting; whereas, a deficiency of asphalt invites raveling and loss of life of the pavement. However, I believe the average engineer and particularly the contractor underestimates the importance of close control of the grading. The most serious damage results when an excess of material from the fine bin is added.

In an effort to illustrate the results of this, we have prepared a series of mixes with various amounts of fine aggregate in the mix and determined the density and stability on each of them.

Figure 4 gives results of these mixes with pounds, from the fine bin, plotted against the percent density for the mix on the basis of a 4000-lb. batch.

The design asphalt content of the mix is 5.5% with an aggregate consisting of 55% limestone and 45% sand. It was estimated that it would require 1700 lb. from the fine bin.

The solid curve represents the densities obtained on the laboratory specimens, which were molded by the gyratory method. Under the most favorable conditions, the corresponding densities obtained in construction, immediately after rolling is complete, will rarely exceed the values represented by the dotted curve, "Maximum Field Density." Under average conditions the field density will approximate the values represented by the dotted curve, "Probable Field Density."

Now insofar as grading specifications are concerned, an extra 380 lb. (2080 lb. total) may be added from the fine bin without violating specifications, but what about the field density? The contractor can obtain the minimum of 92 percent only with long and heavy rolling under ideal condi-

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tions. If an excess of more than 480 lb. (2180 lb. total) is added, he cannot obtain minimum field density by any amount of rolling.

Stability Also Lower

If reduction of field density were the only result of excess fine bin material, the matter might not be of great importance. However, it also results in a reduction of stability as shown by Figure 5. The immediate effect of reducing the stability is manifested by increased difficulty in rolling the pavement out to the "pool-table-smooth" surface which came rather easily while the mix was being propor-

tioned. This is because the mix becomes progressively "squashier" as the stability is reduced. The resultant weakening of the pavement to the resistance of traffic needs no discussion here.

Another factor in the plant control is the temperature. It is common knowledge that overheating of the asphalt or stone is not desirable and most specifications limit the temperature to 300° F. as the mix comes from the pug mill; however, I believe that this matter of keeping the temperature as low as possible is probably overworked in some cases. It should be remembered that an asphalt which

is working satisfactorily at a given temperature, say 265° F. may not work satisfactorily when the weather cools off. Trying to work with a mix too cool is one cause of cracks appearing immediately behind the finisher and this should be taken into account. Also, it should be remembered that the temperature shown on the recording thermometer is not the governing temperature because there will usually be a drop of 15 to 20° F. between the end of the drier and the pug mill. The controlling temperature is that shown on a thermometer stuck into the mix after after it has been placed in the truck.

Field Control Factors

So much for plant control. Assuming that plant control has been satisfactorily carried out in every detail, the pavement can still be a sore disappointment if the field control is inadequate. Among others, there are two outstanding points. (1) The material must be well compacted and (2) a pavement must be obtained that has a smooth surface without waves and irregularities. If the contractor makes an honest effort to obtain good compaction and has adequate rollers there will usually be no difficulty in meeting density requirements. As a general rule, a portion of a hot-mix pavement which will not come up to the density requirements can be detected without running a density test. Such places most commonly occur at an inaccessible point and they can be spotted by the observation of roller creasing and a little heel stomping. Of course, density tests are important and at least one day should be run to ascertain that density requirements are being met, because it may be seen from some of the preceding discussion that inadequate density may result from causes other than inadequate rolling.

In the matter of obtaining a smooth surface, I am a strong believer in obtaining such a surface as early as possible. By this I mean a pavement laid over a gravel or a crushed stone base should not have the first course placed until the base is smooth and solid. If this is done, particularly with the use of the mechanical finisher, the surface will pretty well take care of itself. I believe that men are few and far between who can operate the screws on a finisher to take out irregularities in the foundation. This temptation of the finisher operator seems to exist mostly in resurfacing operation over an irregular base. A much smoother course may be obtained by leaving the screws alone and throwing material back in the depressions and levelling off by raking the first course.

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The fact that raking causes some segregation and an unsightly surface in the base course is without significance because the even surface it produces will make it unnecessary to do any raking in the surface course.

The foregoing article is based upon a paper presented before the last meeting of Division No. 4, The Asphalt Institute, at Oklahoma City.

Kentucky Changes Its Test Procedure

A change in the effective date of a rule permitting use of bituminous materials before completion of tests by the department laboratory has been announced by the Kentucky state highway department.

The rule provided that:

"In order to prevent the delay of the movement of tank cars and other bituminous transportation equipment, it shall be the policy of the Department to permit the use of bituminous materials before representative samples of such materials have been tested and approved by the Department Laboratory, provided that any bituminous material so used, which fails to meet the requirements of the Department's specifications and contract after it has been sampled at the point of destination and tested by the Department Laboratory, be paid for, based on the Department's estimate of its actual value to the Department. This value shall be established in a percentage basis of the cost of the material under the terms of the contract at the point of destination by a committee appointed by the State Highway Engineer.

"Materials consigned to Highway contractors and used on the Department projects shall be subjected to the same provisions as if it had been shipped to the Highway Department for use of their own forces."

"Bituminous materials received and unloaded and placed in bituminous storage tanks, which fails to meet the requirements of the Department's specifications but which has not been used, shall be paid for on the same basis as material which has been used, as set out above, except that in the case of contractors' shipments, if the contractor does not properly empty and clean his storage tanks of other types of bituminous materials or of foreign materials no payment will be allowed."

The new rule became effective for all invitations and proposals on and after April 18 for purchases of bituminous materials by the department of highways or its contractors.

The rule also provides that it will not be necessary for the supplier to

furnish a certified analysis but in all cases a certificate of gallonage and type of material will be required.

Bituminous Cover Scene

The Bituminous Roads and Streets cover this month (p. 59 in this issue of **ROADS AND STREETS**) shows a progress scene on the New Jersey Turnpike. A forthcoming article will give interesting details of this million-ton asphalt paving project. The contractors were granted permission to dispense with side forms in placing the 4½-in. hot-mix asphaltic concrete surface. Three 1½-in. layers instead of

two thicker layers are being placed, representing another specification change, made in the interest of securing greater smoothness in the top lift. The tolerance of ¼ in. in 16 ft. reportedly is being met with no special difficulty.

Asphalt Institute Moves Division Office

Lyle W. Walker, vice president, Division II, The Asphalt Institute, announces that the Division II office has been moved from 431 Main Street, Cincinnati 2, Ohio, to 8 E. Long Street, Columbus 15, Ohio.



Shown in operation here is the M & B Moto-Paver purchased by Middlesex County, Canada, for use in resurfacing old concrete roads and streets. Moto-Paver does the complete mixing and laying job—in one continuous operation.

Resurfacing costs cut approximately 50%

In these days of increasing costs, equipment that will save money is certainly worth investigating. Middlesex County, in Canada, investigated the Moto-Paver and decided to use it on their 1950 road resurfacing program. When the program was completed it was found that the costs were approximately 50% lower than they would have been if the work had been done by conventional methods.

We make no claims that Moto-Paver will save you 50% on your resurfacing costs. But we do say—based on Moto-Paver performance records under all kinds of conditions, that no other machine or method produces comparable results at comparable cost.

Bulletin MP-49 will be sent on request.



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★ Two trucks and their crews are combined here for rapid, intensive patching on U. S. 20, New York (Roads & Streets Photos)

Early Patching Helps New York Roads through "Worst" Spring



NEW York's upstate roads are reported to have suffered the worst winter and spring damage in their history, as the result of the freakish "first warm then cold" weather.

Because of the unusual severity of the season, and the large mileage of roads in serious need of reconstruction, special importance was attached to the New York state department of public works procedure in patching through the winter and early spring months.

Illustrative of the state's methods are those pictured here. These photos were taken late in February on U. S. 20 in the Binghamton state road district. A cold pre-mix was being placed on areas disrupted by heavy traffic, frost and moisture, in this instance a kerosene torch being employed to warm the mix before it was tamped.

Two normal patching crews had doubled up here in order to make rapid progress over this heavily traveled highway, many sections of which have old pavement required heavy and fre-



★ Additional views of the double crew, which performed broomed torch application, raking and tamping. Note safety rails on trucks, for protecting workers in transit. Also spotlight on back of frame, to aid working in winter twilight

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BITUMINOUS ROADS AND STREETS

quent spaced repairs. The double crew consisted of a foreman, two truck drivers, two shovelers, two heater operators, and two rakers who also did tamping. The rakers also took turns brooming water out of the cracks and depressions and swabbing the surfaces to be patched—note that heavy melting is in progress.

Safety Rail Used

A feature on the trucks is the use of pipe railing, installed in the department's maintenance shop for the protection of the crewmen while riding or working up in the truck. Immediately behind the cab on each truck, also note



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anti-stripping additive makes it possible for liquid bituminous materials to adhere to wet, moist or dry aggregates . . . prevents stripping under adverse conditions of moisture and low temperature.

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actually displaces water, it binds asphalt to the aggregate and to the road surface.

SURFACE TREATMENT

With **DARAKOTE**, surface treatment goes on uninterrupted, rain or shine, no matter if aggregate and old road surface are drenched, damp, or bone dry.



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With **DARAKOTE**, less blading and mixing is required—often aerating and drying out windrows is accomplished in half the time. Demurrage and standby time is reduced.



TRAVEL PLANT MIX

DARAKOTE adds working days to your paving season. Asphalt maintenance and paving programs continue as scheduled, costly delays are eliminated.



PLANT MIX

DARAKOTE is more effective at all working temperatures. It retains its effectiveness under heat, will not settle out or deteriorate in processing, storage, or use.

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San Leandro, Calif. Montreal 32

★ Cold pre-mix purchased commercially is stockpiled at strategic points and loaded into trucks with belt loader units or other mechanical means

the wooden box built to shelter men while traveling.

The **ROADS & STREETS** editors were unable to secure any official information from the Binghamton district on the methods used in such patching.

However according to William Robinson, district engineer at Syracuse, which also has a section of U. S. 20, his district for several years has done early-season cold patching with a commercially prepared asphaltic concrete mix (½-in. max.) made with a medium-cure cutback asphalt to which a wetting agent has been added at the refinery. This mix is prepared in the autumn before the plants close for the winter, and stockpiled either at the plants or at locations selected by the highway department. The wetting agent is used to improve adhesion under adverse weather conditions. This mixture varies in its ability to perform under such adverse conditions, but the reasons for the variations as yet are not clearly understood according to Mr. Robinson.

3300 Tons of Mix

Such patching is designed to serve until weather conditions permit more durable work. About 3300 tons of patching mix was used during the 1949-50 winter and spring.

During the past winter and spring over 9,500 miles of state, county or town roads at some time or other were posted as closed to all traffic heavier than passenger cars or light trucks. In 41 upstate counties the arterial mileage so restricted totaled 1,515 miles or 16% of the system. The usual posting has allowed 2 to 2½ tons per axle on state roads, while county and town officials have permitted up to 2 to 6 tons gross or over-all load under varying conditions. Postings were lifted under a county-by-county survey of conditions.

Composition of Mixture used by Syracuse District for Winter and Spring Patching

Passing	Retained	Coarse	Intermediate	Fine
—	1"	0-5%	—	—
1"	1 1/2"	35-60%	0-5%	—
1 1/2"	1 3/4"	20-40%	25-40%	0-5%
1 3/4"	1 7/8"	5-15%	35-55%	55-85%
1 7/8"	No. 80 sieve	5-15%	15-30%	20-35%
No. 80 sieve	—	0-5%	0-5%	0-5%
Hydrated Lime	—	0-1%	0-1%	0-1%
Bituminous Material (including additive)	—	3.5-4.5%	4.5-5.5%	5.25-5.75%

With the Manufacturer and Distributors

Appointed District Manager. H. J. Schulte has been appointed district manager for the Reilly Tar and Chemical Corp. He will operate from the new Cleveland sales office, 20106 Kinsman Road, Shaker Heights, O. The new office will handle sales in eastern Michigan, Ohio, western Pennsylvania and Buffalo area of New York.

New Eagle Iron Distributor. Coast Equipment Co., 948 Bryant St., San Francisco, Calif. has been appointed exclusive sales and service representative for the Eagle Iron Works, Des Moines, Ia.

FWD Promotes Walch. Bruce V. Walch, formerly manager FWD Parts Sales Department, has been appointed manager of the Field Service Department of The Four Wheel Drive Auto Co., Clintonville, Wis.

Hinz Joins Wayne Division. A. C. Hinz has been added to the administrative sales staff of the Wayne Division of Gar Wood Industries, Inc., Wayne, Mich. He will have charge of the winch and crane section of the division.

Diachuk Joins Gumont. Richard Diachuk has been appointed a field service representative of the Gumont Division, Pennsylvania Refining Co., Cleveland, O.



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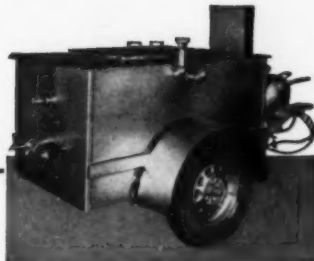
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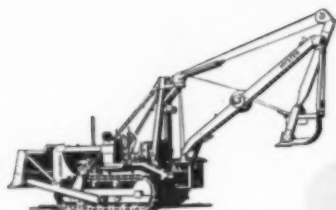
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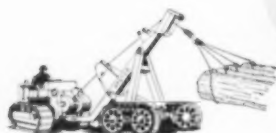
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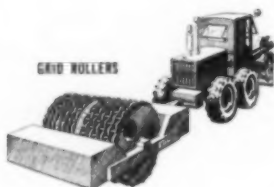
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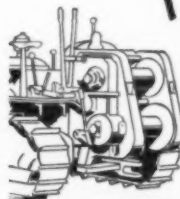


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REDUCING THE HAZARDS OF

Electrical Blasting

Summarizing the findings of recent research on this subject by the corps of engineers at Fort Belvoir

RESearch aimed at reducing the hazards associated with electrical blasting equipment was recently completed by the Engineer Research and Development Laboratories at Fort Belvoir, Virginia, under contract with the University of Maryland. Several explosives companies also aided greatly in this work. Although much of the research served only to confirm previous determinations, some significant findings did result from investigations of lightning, static electricity and especially radio transmitters and transmission lines.

The chief danger in using electrical blasting equipment is the extraneous electrical energy that may enter electric blasting circuits from the outside and cause premature firings. Although this electricity can come from several other sources, those mentioned above present the most serious hazards.

As to lightning, since there is no method of electrical blasting known that can be relied on to offer protection against direct hits, a complete suspension of operations is strongly recommended. Even a near miss can cause a detonation. In fact, lightning strikes to ground a mile away have caused premature firings in deep mines.

Precautions Suggested

Grounding one leg of a blasting circuit at one end or at both ends offers no protection. However, experiments showed that cap shells grounded to one leg wire offer some protection by preventing sparks from jumping between leg wires and shell through the sensitive mixture. If it is necessary to fire during a storm, holes should be fired with a detonating fuse that contains no metallic braid or conducting components. As few holes as necessary should be fired. Series firing with avoidance of loops in the lead wire will also contribute to safety.

The next hazard investigated was static electricity. Mechanically generated by escaping steam, moving belts, revolving automobile tires, etc., and ordinarily considered harmless, static

electricity can be a ruthless killer when found near electrical blasting equipment. For instance, uncoiling the leg wire by throwing it out through charged air will sometimes detonate the cap. The best precaution is to straighten out the long length cap wire along the ground. The use of spool wound caps is a good solution.

In the case of mechanically developed static: (1) all moving equipment should be connected with ground by a circuit having a resistance of not more than one ohm, (2) the connections should be taped or otherwise insulated, (3) wiring should be kept away from rails, other wiring and piping which may be conveying electrostatic charges, (4) the shunts on the cap leg wires should not be removed until explosive charges have been placed and the firing circuits are ready to be hooked up.

One of the most serious hazards to electrical blasting is location near a radio transmitter. However, at present, because it is such a complex function it is practically impossible to devise a means to operate a blasting

circuit close to a transmitter that will absolutely guarantee safety. The only safety seems to be to operate at a "safe" distance, or, if this is impossible, to terminate transmission activity until the blasting is over.

Checking Danger Spots

There is one method of checking danger spots which, though not fool proof, is fairly effective. It consists in setting up a dummy circuit and connecting into it at points where caps are to be located a small one-cell flash-light bulb drawing low current such as a #47 pilot lamp. If such a lamp glows in a circuit, the placement of a cap at that point may be considered potentially dangerous.

Another serious hazard is the location of blasting operations near transmission lines. Measurements were made of the induced currents and voltage in wires placed at or somewhat above ground level under 110,000-volt transmission lines. These included measurements of the induced effects from both the electromagnetic field and the dielectric field.

For results in the electromagnetic field, most of the measurements were made under two 110,000-volt, 3-phase transmission lines which were carrying balanced currents of the order of

★ Control of extraneous electric energy is a chief safety precaution with blasting by electrical methods. (Photo supplied by the Le Roi Company, Courtesy St. Louis Globe-Democrat)



200 to 220 amperes. At the test location, a 220,000-volt, 3-phase transmission line ran adjacent to the 110,000-volt lines. Two test wires were placed parallel to the transmission lines in different positions. They were connected solidly at one end and through either an ammeter or voltmeter at the other end to complete the circuit. The induced current and voltage were measured for each position of the test loop. The tests indicated that both the induced currents and voltages will decrease as the area enclosed by the test loop decreases.

To obtain results in the dielectric field, a test wire was supported 5½ ft. above the ground and parallel to the transmission lines for a length of 240 ft. A voltage of about 2000 volts to ground was measured on the test wire by connecting an electrostatic voltmeter between the test wire and ground. When the test wire was grounded through a microammeter, currents of the order of 500 microamperes flowed to the ground. When the insulated test wire was lowered to the ground, no voltage between the test wire and ground could be detected by the electrostatic voltmeter and the current to ground with the test wire grounded was very greatly reduced.

These test results indicate that induced effects from the dielectric field under a transmission line are very small for wires on the ground as compared to wires raised a short distance above the ground. The tests were made during normal system operation. It is possible that transient conditions existing during system troubles or lightning storms may cause induced effects considerably in excess of those measured. Different results may also be expected for lines operating at voltages or currents, lines with unbalanced currents or lines of different configuration.

Texas Safety Program

(Continued from page 40)

Safety Association, Incorporated, which is the coordinating agency for the Governor's Highway Traffic Safety Program. Teamwork here, like teamwork within its own organization, reaps rich rewards.

SUMMARY. Perhaps the most significant points to be noted from the foregoing description of the Texas Highway Department's Traffic Safety Program is the fact that the application of sound, proved engineering principles still pay dividends; that decentralized operation with proper coordination, planning, and teamwork runs efficiently; that any worthwhile

accomplishment belongs to the whole Department and not to any one unit or individual of the Department; and that teamwork with other agencies concerned is just as essential as teamwork within one organization.

•
"Highway Planning." Bulletin No. 31 of the Highway Research Board bearing this title has been issued. Copies are available for 60c each. It contains papers by I. S. Shattuck and K. D. Rykken, comprehensively treating this important subject. Address request to the Highway Research Board, 2101 Constitution Avenue, Washington 25, D.C.

The Angle Prism

(Continued from page 49)

boundary lines are surveyed by offsets from the traverse line, the length of the individual boundary lines should be measured as a control. The courses can be computed by simple trigonometric formulas.

Another valuable application of the right angle prism is the staking of curves by right angle offsets. In Fig. 8 the staking of a curve by tangent offsets is shown. Equal distances along the tangent are measured and for each tangent point the offset distance is computed.

If it is desired to maintain the stationing along the curve, the tangent distances A and the offsets B for each curve point P are computed as shown in Fig. 9.

Another method of laying out circular curves is to establish the curve points by offsets from a chord as shown in Fig. 10.

The right angle prism is particularly for trigonometric distance measurement as shown in Fig. 11, 12 and 13. The sub-base *b* must be accurately taped and the subtended angle *a* observed with great care. The right angle at the sub-base can be staked out accurately with a right angle prism and a theodolite, a one second reading micrometer theodolite is particularly suited for this type of work. The sub-base length *b* will have to be only about 1/10 to 1/20 of the length of the traverse distance *d*. The distance *d* is calculated from the formula:

$$d = b \cot a$$

No slope corrections are necessary.

The illustrated applications for the use of the right angle prisms are only a few and many other field problems can be solved with this handy little instrument at a great saving in cost.

Soil-Cement Speedily Built In N. Carolina

That soil-cement roads can be built speedily was demonstrated by W. H. Scott, contractor from Franklin, Va., on a 20-mile project in Forsyth County, N.C. This 18½-ft. width paving consisted of 8 sections and was built in June and July, 1950.

Two outstanding day's production records were 6780 and 5700 lin. ft. of paving. All work was completed during daylight hours. Average work-day production was between 4000 and 5000 lin. ft. Soils varied from sandy clay loam to clay loam requiring 10 to 12 per cent cement by volume. Cement haul was 2½ to 3 miles and water haul averaged 1 mile on one project and 2½ miles on the second project.

Equipment and Personnel

To obtain this excellent production record the following list of equipment and personnel was used during full scale operation: 4 dump trucks (cement); 1 bulk-cement spreader; 2 rotary speedmixers (self-propelled); 1 heavy-duty cultivator; 1 two-bottom gang plow; 2 crawler-type tractors; 2 rubber-tire tractors; 5 water trucks (1000-1500 gal. cap.); 1 sheepsfoot roller; 1 spike-tooth harrow; 2 motor graders; 1 pneumatic-tire roller.

Personnel: 1 superintendent; 2 foremen; 1 mechanic; 2 mixer operators; 2 motor grader operators; 4 tractor operators; 10 truck drivers; 7 common laborers.

Superintendent for W. H. Scott was H. M. Smith, Assistant Superintendent was Joseph Kirkman.

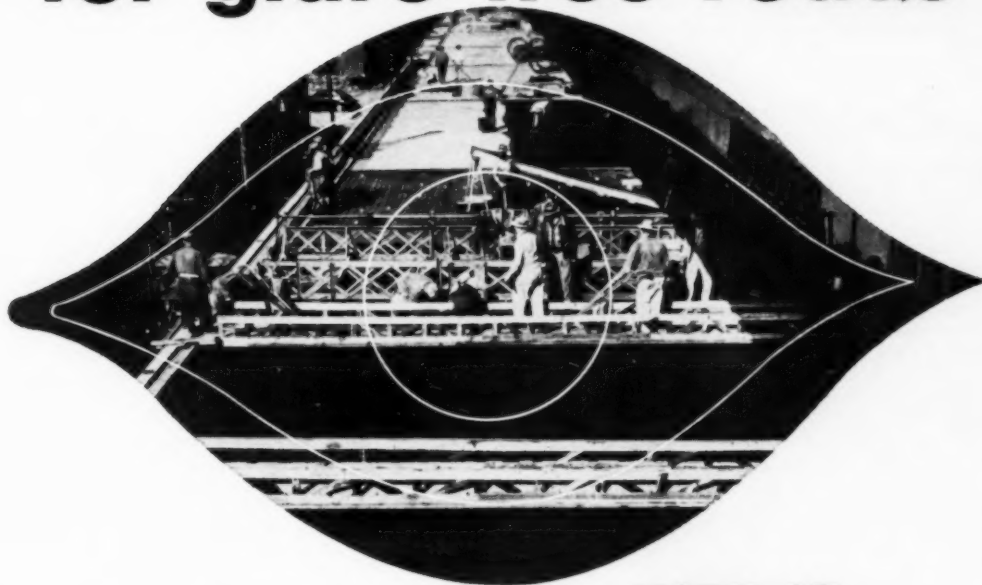
New Building Reference

"Architectural Graphic Standards," probably the best-known and most widely-used reference book for architects, draftsmen, engineers, and builders, has been issued by John Wiley & Sons in a new, much enlarged 4th edition. Almost double the size of the previous edition (614 pages). Architects Charles G. Ramsey and Harold R. Sleeper, authors, have added 368 new plates, while revising 151 plates. The 50-page index including 12,000 cross-indexed entries. Price \$10,000 John Wiley & Sons, 440 Fourth Avenue, New York 16, N. Y.

•
A recent article in an Ohio newspaper created much favorable comment. It said in part:

"Few Americans realize it, but by far the biggest freight carrier in the nation is the motor truck. Last year, trucks hauled 8.3 billion tons of freight—or three times as much tonnage as was hauled by all the railroads, pipelines, waterways, and airways put together."

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Surface cracking reduced because the surface is more uniform in temperature.

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When writing advertisers please mention **ROADS AND STREETS**, July, 1951

Water-filled Pneumatic Tires

This idea is being used successfully by Texas highway department—better traction, less tire heat.

By J. F. Snyder

District Engineer, Texas Highway Department

IN the interest of economical equipment operation and savings in wasted labor time, we would like to pass on to you information concerning the use of one hundred per cent water-filled pneumatic tires.

We are all familiar with the use of water in large pneumatic tires to increase traction; also, the use of water to replace most of the air to make the tire run cooler, but the advantages and benefits to be gained by the use of 100% water and complete elimination of air may or may not be realized.

In our attempt to cut down loss of time in our weed mowing operations, we tried puncture proof tubes, liners, etc., and finally tried using 100% water in place of air. This proved promising, so we had two or three units prepared for further study, which resulted in almost entirely eliminating punctures from thorns and small nails. The use of water-filled tires was then extended to our maintainers, and with remarkable results. We had considerable trouble with "wobble" on the large front wheels now coming with our maintainers, and this "wobble" was completely eliminated when the tires were filled with water.

Having these tires filled by commercial dealers cost \$4 to \$7 per tire, or \$16 to \$30 per unit, which was rather high, but still economical in the long run. In June of last year we requested the Equipment Division to purchase a unit for filling tires with

water, and since then we have filled all pneumatic tires except trucks, pick-ups, and automobiles, and have practically eliminated punctures from thorns and small nails. It appears, judging from the service the first water-filled tires have given us, that the use of water would practically double the life of the tires. Picture 1 shows the condition of recapped tires after two years use.

Data on Results

Most of our mowers are now in the District Shop for general repairs and reconditioning for the coming season, and several tires have been removed for recapping. The two rear tires and tubes inspected by the writer had forty-two small thorn and nail punctures but the tires were standing up when brought to the shop and showed no indication of leaking. When the water was removed and refilled with air, everyone of these punctures leaked and would have been a flat if filled with air.

A flat tire on a mower out on a job will result in not less than four hours lost mowing time, possibly time of a shop employee and equipment rental from the shop. If the mowerman loses four hours at \$1 per hour, that would be \$4. Forty-two flats times \$4 equals \$168 and not counting shop time or equipment rental used in getting this machine back in operation. This is for one season and one machine. Multiply this by the number of mowers in use plus the maintainers and other pneumatic tired equipment, such as small tractors, rollers, and asphalt heaters, subject to such punctures, and some idea of the saving will be realized. Of course, in North Texas anti-freeze would be used during the winter months, which

would add a small expense to the use of water, and in our opinion would still be economical.

The tire filling unit in use in this District is a gasoline-driven Gorman Rupp and cost \$180, so you see that on one mowing unit we practically saved the cost of this machine. Pictures of the unit are shown.

Barber Brothers Break S/C Record in Louisiana

Experience in building soil-cement and good organization can result in a record performance. Barber Brothers Co. of Baton Rouge, La. has made such a record by building 8.1 miles of soil-cement base in 11 working days. The stretch completed was on the Merryville-Bancroft highway in Beauregard Parish.

To achieve this record production, Barber Brothers used the following: 2 No. 12 motor graders; 1 bulk cement charger; 4 cement trucks (10,000-lb. cap.); 1 bulk cement spreader; 4 water trucks (1500-gal. cap.); 1 traveling mixing machine; 1 sheepsfoot roller; 1 TD-18 tractor; 1 pneumatic-tire farm tractor; 1 pneumatic-tire roller; 1 spiketooth harrow.

Highlighting the job was the completion of 14,000 sq.yd. or 1.2 miles of 20-ft. wide pavement in one day. Ten per cent cement by volume of compacted roadway, 6 in. thick, was used. Added to this day's work was 125 sq.yd. of soil-cement in bridge transitions.

Much credit for this feat goes to Barber Brothers' Walter Dickerson and foremen C. N. Swindle and D. King.

Forty-two truck weighing stations are to be constructed by the N.Y. state department of public works, required to implement the state's new Truck Mileage Tax Law, effective October 1.



★ Photo 1. Recapped, water-filled tires look good after two years of trial on mowing machine



★ Tire filling outfit which has paid for itself by betterment of service from one mower

OPERATORS SETTING NEW
Sweeping Records
 WITHOUT LEAVING THEIR SEATS . . .

*Fully Automatic**

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Fluid-Driven

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Provides Unexcelled
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The most powerful tractor-loader in its class! Fast, smooth hydraulic action. Rips pavements, digs hard materials, scrapes, fills, lifts, loads, bulldozes, etc. On any job—an outstanding time and money saver!



Longest reach of any industrial wheel-type tractor-loader. Loads from rear to very front of truck body. A full load every time without pushing dirt forward in box. Get full details on the versatile Lull Shovel loader, today!

LULL POWER HYDRAULIC CONTROL RAISES AND LOWERS BROOM . . . or sets at any angle in SECONDS!

The operator of this powerful deluxe Lull Super Sweeper is setting new standards for sweeper performance. He spends all his time sweeping and eliminates wasteful time-consuming manual adjusting operations. He never needs to leave his seat to remove a pin—or turn a crank—or even stop his forward motion to change his sweeping angle. At his finger-tips are all of the controls for broom rotation, speed, height and angle settings, independent of traction motion! He can make any angle selection from 35° left to 35° right in seconds.

LULL POWER HYDRAULIC CONTROL makes this amazing sweeper performance possible. With super speed and super power in the broom, the operator can cover more ground in less time. No backing . . . no deadheading. The Lull Super Sweeper is the ideal 2-way sweeper. Yes, it is so fast, the operator often gets his sweeping done in half the time, making himself available for other work.

Use Lull Super Sweepers for every sweeping job from snow removal in the North to strip mining operations anywhere. A heavy duty sweeper designed for super performance, and priced within the means of all users of power sweeping equipment. Write for literature on 5', 6', 7' models.



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NEW EQUIPMENT AND MATERIALS

1 Gasoline Engine Earth Auger

A new lightweight highly maneuverable portable gasoline engine earth auger, announced by Mall Tool Co., is made with new magnesium alloy castings and equipped with 30 in. augers in either 6, 9 or 12 in. diameters. To serve as a dual-purpose machine, this digging unit quickly converts to chain sawing.

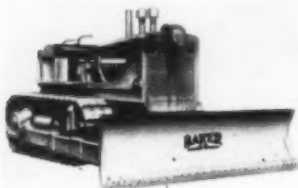


The digging attachment is detached and replaced with chain saw assemblies that are available in cutting capacities from 18 inches to 7 feet. With this one engine and both attachments, post and pole timber can be felled, cut to size and placed in the ground faster and more economically. This unit can also be used to saw large building timbers on the job or clear right-of-way and building sites of trees. Mall Tool Co., Dept. RS, 7725 South Chicago Ave., Chicago 19, Ill.

For additional information circle number of this item on Readers Service Card.

2 Cable-Control Mountings

Redesign of cable-control mountings for the new and larger line of bulldozers, graders and root rippers developed to match the new and more powerful Allis-Chalmers crawler tractors, has been announced by The Baker Manufacturing Co. Redesign of the cable-control mounting provides maximum visibility, streamlined appearance, easy interchangeability, improved protection for cables



New Cable-Control Mounting

and radiator and new push beam power tilt. The low frame cable mounting provides streamlined appearance with greatest visibility. Baker officials point out. The cable is located under the fender, close to the side of the tractor, well protected from brush and limbs. The built-in radiator guard with perforated grill, is an integral part of the cable frame. Quick, easy interchangeability between dozer, grader and root ripper is provided by removal of a bolt on each side, removal of wedges and detachment of the lower sheave block at the front. The new power tilt eliminates need for jacks or pry bars to raise or lower the push beam. Reverse tilt of the moldboard also is accomplished by power, rather than manual effort. The Baker Manufacturing Co., Dept. RS, 502 Stanford Ave., Springfield, Ill.

For additional information circle number of this item on Readers Service Card.

3 Swing Loader

Fourteen major changes have been incorporated in the new 1952 Model 58L-R1 Mandt swing loader. These changes include: new steering axle and larger wheels and tires, cushion in bucket cylinder to eliminate shock at end of stroke (when dumping), clearance on



1952 Model L-R1 Swing Loader

boom for boom cylinder when boom is in upright position, drag brake on worm shaft of all machines, control valve adjustments and changes in machining of control valve spools, flow controller on crane boom hydraulic line, weight boxes altered to conform to new steering wheels and for clearance for chains on drive wheels, drive axle mounting-block and brace underneath. Mandt Manufacturing Co., Dept. RS, 490 West Goodale St., Columbus 8, O.

For additional information circle number of this item on Readers Service Card.

4 Break-Resistant Blade

A new Clipper break-resistant masonry cutting blade is manufactured in layers of glass fiber cloth impregnated with resins and silicon carbide. This material is then pressed together under



Test of New Clipper "B-R" Blade

hydraulic pressure and processed in kilns where the temperature is scientifically controlled to insure a resilient and tough blade able to take amazing punishment. It is claimed that dropping, twisting in the cut or bending will not damage the blade. The new blade is stated to give outstanding efficiency on small hand-power tools where it is impossible to maintain a true cutting level. Clipper Manufacturing Co., Dept. RS, 2800 Warwick, Kansas City 8, Mo.

For additional information circle number of this item on Readers Service Card.

5 Distributor Spray Bar

A new Littleford development is a full circulating spray bar 24 ft. wide so light that one man can easily lift it. It is a bar end folding type which can be quickly folded for traveling to and from the job. And since its weight is less than half that of steel, it greatly reduces



"Lite-Wate" Circulating Spray Bar in Spraying Position

the load at the rear of the Littleford "Spray Master." Mounted on a Littleford distributor, this bar sprays by pressure and circulates materials by vacuum, thus, it is stated, assuring clean, even starts, instant shut-off without drip, and suck-back of any material left in bar after spraying. Lengths of bar may be added quickly by loosening only two bolts. When spraying, all nozzles open instantly and simultaneously, each nozzle can be individually turned off to give any desired width of spray. The new "Spray Master" bituminous distributor has been refined to embody many labor saving features. Littleford Bros., Inc., 454 E. Pearl St., Cincinnati 2, O.

For additional information circle number of this item on Readers Service Card.

6 Balanced Vault Cover

A new safety counterbalanced vault or manhole cover, announced by E. E. Wachs Co., is designed for safe and easy operation. Opening is accomplished by inserting a combination key-handle and giving it a half turn. Lifting the cover to its



DO ALL YOUR MIXING WITH THE SEAMAN

The new, 1951 edition of "Soil Stabilization Methods" is off the press. Completely revised and enlarged, 100 pages of pictures, diagrams and practical construction information. It's

FREE. Just ask for Bulletin 25. Write today.



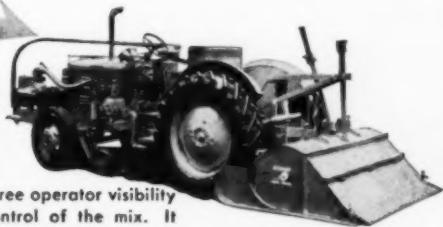
ROAD MIXING with the SEAMAN is the quick, low cost, efficient method. The SEAMAN is engineered and built specifically for that job—just as blades, for example, are built for grading, shoulder work and general maintenance.

The SEAMAN MIXER is designed to mix completely to the bottom of the full selected depth. No unmixed material at the subgrade—and no subgrade material brought up into the mix. Depth control is accurate and positive under all conditions.

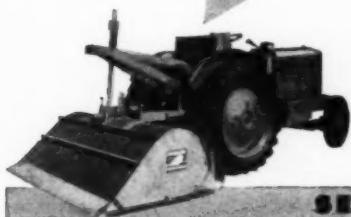
And you have complete command of the mix itself at all times. No worries about an unsatisfactory operation even when conditions are adverse, for with the SEAMAN an additional pass to bring the mix up to specification is done quickly and at low cost.

It pays to use the equipment which has been *designed* for its particular job. That's why more and more contractors and highway officials insist that *all* mixing be done with the SEAMAN.

The SEAMAN Self-Propelled (left) is a complete mixing unit which offers full 360 degree operator visibility and accurate control of the mix. It also frees a critical tractor for other work . . .



The SEAMAN TRAV-L-PLANT (right) offers all the advantages of the Self-Propelled unit. It is equipped with tachometer assembly and a volumetric meter is available for the closely controlled application of bitumen. Water also is readily applied.



SEAMAN MOTORS, INC.

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New Wachs Safety Counterbalanced Cover

vertical open position is a one-handed job because counterweights, which also hold the cover in a protective upright position, ease the load. Other features of the cover are: one man can safely raise cover with ease, cover can not slam or drop into vault to cause injury or damage, cover can be opened from inside of the vault by one man, positive tamper proof lock that can not be opened without Key-Handle, counterbalance structure protrudes less than 6" from wall, 30" square opening, heavy duty cast iron frame and ribbed steel cover machined for accurate rattle-proof fit, "Oilite" bronze bushings in linkage, etc. The E. E. Wachs Co., Dept. RS, 1527 N. Dayton St., Chicago 22, Ill.

For additional information circle number of this item on Readers Service Card.

7

Battery Operated Stacker

An ingenious combination fork lift-stacker and hand truck with elevating platform operating from a standard 6-volt automobile battery, is being introduced by Clark-Hopkins Equipment Corp. It is capable of moving, lifting, and stacking loads up to 750 lb. This new unit has a battery activated motor mechanism which operates the hydraulic lift. What little drain is placed on the battery under capacity use is replaced by the built-in charger during off-hours.



Automobile Battery Operated Stacker

The stacker will lift a load of 750 lb. to a loading height of 55 in. in 6 seconds. The stacker has a platform 21 in. long by 18 in. wide as standard. Clark-Hopkins Equipment Corp., Dept. RS, 1124 Spring Garden St., Philadelphia 23, Pa.

For additional information circle number of this item on Readers Service Card.

8

Ripper Attachments for Bulldozers

New type ripper attachments for bulldozers, made by Hensley Equipment Co., make ripping and dozing at the same time possible. The rippers are available in 12 models to fit all standard bulldozers and scrapers. The ripper shanks



Hensley Ripper Attachment

are attached to the bulldozer blades in a matter of minutes. On the back of each shank is an I-bolt, which is fastened to a small bracket which is welded to the back of the blade. The rippers have reversible wear boots, which because of their special alloy content, are extremely resistant to wear and abrasion. The boots are self-sharpening. As soon as one side is worn, the boot may be reversed and used again. The shanks of the rippers have the benefit of the full weight of the dozer blade. They are angled so as to automatically dig into the rock, shale or soil. It is stated the rippers will dig to a depth of 12 in. in one pass if there is not an excessive amount of rock in the surface. When a large amount of rock or shale is encountered, adequate ripping action can usually be obtained in two 6-in. passes. Hensley Equipment Co., Dept. RS, Joaquin Ave., San Leandro, Calif.

For additional information circle number of this item on Readers Service Card.

9

Trencher Has Forced Ejection Bucket

Several outstanding improvements in the 1951 model of the Oliver-Ware hydro-trencher have been announced by the Oliver Corporation. According to the manufacturer, the outstanding feature of the new model is the "Forced Ejection" bucket, which is available as optional equipment. It can be used with equal ease for both trenching and swing loading. Simply reversing the bucket and dipper stick converts it to a swing loader. The bucket does not have controlled pitch; instead, the control cylinder is used to hydraulically force the bucket gate all the way through the bucket itself, thus "forcing" out all material and assuring complete discharge even where clay, gumbo, or sticky soil is involved. In addition, the 1951 hydro-trencher has an improved counterweight design, is more ruggedly built with a weight increase of approximately 2000 lb. The



Hydro-Trencher with Forced Ejector Bucket

Oliver Corporation, Industrial Division, Dept. RS, 19300 Euclid Ave., Cleveland 17, O.

For additional information circle number of this item on Readers Service Card.

10

2-Wheel Scraper

A new 2-wheel, hydraulically-controlled scraper for use with the John Deere "R" diesel tractor has been announced by American Tractor Equipment Corp. This new scraper, Model H-62, is a 6 yd. scraper and is stated to work at speeds



Model H-62 6 yd. Scraper

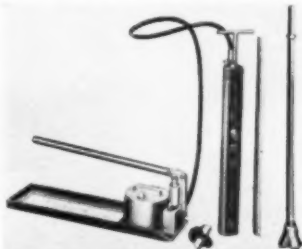
up to 12 m.p.h. A special hitch, mounted under the tractor rear axle, eliminates the front wheels of the scraper and transfers a portion of the scraper load to the tractor driving wheels for greater pulling power. It is self-loading and extra leveling equipment is required. Like the ATECO conventional 4-wheel scrapers, this new model for use with the John Deere "R" tractor, has a low center of gravity, a high road clearance that permits easy hauling over ditches and levees, an independent front apron, and a rear apron that wipes the scraper bowl sides clean as the load is dumped. American Tractor Equipment Corp., Dept. RS, 9131 San Leandro Blvd., Oakland 3, Calif.

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11

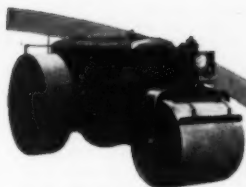
Hydraulic Rock Breaker

A hydraulic tool for the demolition of mass concrete or ledge rock where the use of explosives or ball drop is prohibited or impractical, has been placed



Duncan Hydraulic Roc-Jak

ROADS AND STREETS, July, 1951



5-10 Ton Model VM 3-Wheel

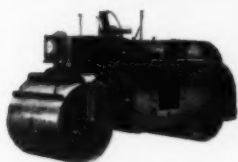


10-15 Ton Model VM 3-Wheel

IN ROLLERS...IT'S

Buffalo-Springfield

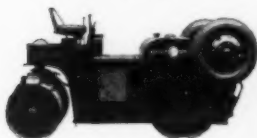
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THE WORLD OVER**



5-9 Ton Heavy Duty Tandem



8-14 Ton Heavy Duty Tandem



3-5 Ton Portable Tandem



Trench Roller



KX 3-Axle Tandem

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You own the *best* in roller equipment—for less per year than cheaper rollers—when you own Buffalo-Springfield.

That's because Buffalo-Springfields are built to *last longer*—cost less to operate and maintain. They're extra rugged, sturdy, dependable. Made in a variety of types and weights to meet every compaction need, by the world's largest exclusive manufacturer of road rollers.

Buffalo-Springfield service excels also. Buffalo-Springfield distributors in all 48 states and Canada feature modern facilities and complete stocks of genuine factory parts to keep your equipment rolling up profits.

Better see your Buffalo-Springfield distributor before you buy. Or, write the Buffalo-Springfield Roller Co., Springfield, Ohio, for full information.

BUFFALO  **SPRINGFIELD**
SPRINGFIELD, OHIO

WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF ROAD ROLLERS.

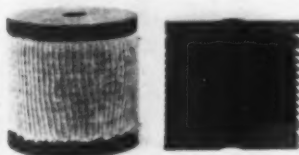
on the market by Duncan Roc-Jak, Los Angeles. The Roc-Jak breaker body is 24 in. long and 3 in. in diameter. It is constructed of the toughest and finest steel. Each breaker is heat-treated and piston openings precision ground. The ten, hardener 1½ in. alloy steel pistons are fitted with neoprene cups tested to withstand 15,000 p.s.i. Each unit is equipped with an equalizing shim, hydraulic pump, hose, drill rod and six 3½ in. drill bits. The weight of the Roc-Jak with hose and pump is approximately 94 lb. Duncan Roc-Jak, Dept. RS, 1350 Wright St., Los Angeles 15, Calif.

For additional information circle number of this item on Readers Service Card.

12

Cellulose Oil Filter

A new oil filter, developed by The Briggs Filtration Co., uses molded cellulose fibers as the medium. A bonding agent is applied to natural cellulose materials which are formed, under pressure, into "cartridges" of blocks. The size of



New Briggs Oil Filter

the fibers controls the porosity of the block. The blocks are then stabilized by a series of thermal processes which fix the finished dimensions. The blocks are rendered impervious to water and therefore retain their original dimensions in use. Laboratory and field tests on the blocks have been in progress for several years, and are reported to show that the new medium has a higher dirt retention capacity than any known materials, and that there is no "unloading" action between filtration cycles. Briggs Filtration Co., Dept. RS, Washington 16, D. C.

For additional information circle number of this item on Readers Service Card.

13

Tractor-Loader Digs at Either End

A hydraulic tractor-loader, announced by the Oliver Corporation, has the ability to dig at either the front or rear end of the tractor, and to dump always in front, leaving the operator free to select the digging end to fit the job. He can load without turning the tractor. Advantages claimed include the following: High mobility of wheel tractor; the increased speed and reduced tractor



"Strait Line" Hydraulic Loader

wear; increased traction possible with rear end digging; easy steerability that reduces operator fatigue. This "Strait Line" hydraulic loader is manufactured by Maine Steel, Inc., South Windham, Maine, for use exclusively on the Oliver Model "77" industrial wheel tractors and is available only through Oliver Industrial Dealers. The Oliver Corporation, Industrial Division, Dept. RS, 19300 Euclid Ave., Cleveland 17, O.

For additional information circle number of this item on Readers Service Card.

14

Masonry Drill Bit

A new carbide tipped masonry drill bit now in production by New England Carbide Tool Co., has a removable center which does away with the necessity of using a wood template to start holes. When inserted, it accurately locates and



Cyclo-Core Masonry Drill Bit

starts a hole. As soon as hole is spotted the center is removed. This accessory also is stated to do away with walking of the bit or marring of the surface being drilled. Dust is expelled by the bit as it drills because of the machined-in spiral threads running the full length of the body. These threads make automatic runways for removing dust from the hole as it is cut. Each bit has a port opening for cleaning out the core. New England Carbide Tool Co., Dept. RS, Cambridge 39, Mass.

For additional information circle number of this item on Readers Service Card.

15

Fire Fighting Unit

A new pallet model Porto pumper fire extinguishing unit mounted on a truck converts it into fire fighting apparatus. Porto pumper's basic equipment is com-



Pallet Model Porto Pumper Fire Extinguishing Unit

posed of a water tank with capacity in excess of 200 gal., hose rack (capacity 600 feet of 1½ in. discharge hose), a demountable Porto pump (which is a rotary positive displacement type rubber gear pump powered by a 4-cycle gasoline

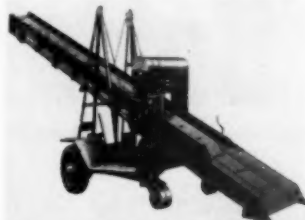
engine), supply hose, aluminum extension ladder, 200 feet fire hose, fire axe and hand extinguisher, straight stream nozzle, combination fog and straight stream nozzle. The slip-on unit pallet model Porto pumper can be easily and quickly removed from the trucking equipment at any time, releasing this equipment for other uses. Porto Pump, Inc., Dept. RS, 227 Iron St., Detroit 7, Mich.

For additional information circle number of this item on Readers Service Card.

16

Troughed Belt Conveyor

A new Fairfield heavy-duty material handling conveyor is stated to be especially designed for construction field operations. This latest Fairfield has a



Model 638 Power Moved Troughed Belt Conveyor

new simplified drive and controls—improved maneuverability of individual wheel steering—hydraulically operated boom hoist—and self equalizing castors for balance in yard operations. Fairfield Engineering Co., Dept. RS, Marion, O.

For additional information circle number of this item on Readers Service Card.

17

Form Clamp

A new Hex-Lock form clamp, developed by Williams Form Engineering Corporation, has as its principal feature the combining into a single unit an adjustable Hex-Lock floating nut and bracket. This combination of nut and bracket, is freely operative as one unit. The new Hex-Lock clamp permits the turning of metal on metal and reduces the friction considerably by not having to turn the metal on the wood. Williams Form Engineering Corporation, Dept. RS, 1501 Madison Ave., S. E., Grand Rapids 7, Mich.

For additional information circle number of this item on Readers Service Card.

18

Road Maintainer

A new road maintainer introduced by Dearborn Motors, which designed primarily for maintenance of unsurfaced roads and road shoulders is stated to be capable of numerous construction operations. Powered by a Ford tractor,



Dearborn Road Maintainer

the maintainer is stated to provide many features found in heavy motor graders. The 8-ft. blade is operated by a separate hydraulic mechanism powered directly by the Ford engine crankshaft, freeing the Ford tractor hydraulic mechanism to operate accessory equipment. The blade can be operated in three pitch positions and nine angle positions and can be lifted 9½ in. above the ground, all through positive hand levers or hydraulic controls. Maximum blade pressure is 3,500 pounds with the blade at a 90 degree angle to the frame. The entire maintainer attachment can be removed from the tractor in approximately three hours and the Dearborn side mounted mower installed on the tractor for high-way mowing. Where advisable, the mower can be installed without removing the Maintainer attachment. Dearborn Motors Corporation, Dept. RS, Birmingham, Mich.

For additional information circle number of this item on Readers Service Card.

19

Men Working Sign

A new type "A" safety standard to warn motorists approaching work areas, introduced by Eastern Metal is a specially designed (patent pending) sign which won't blow over. It weighs only 13 lb. and folds together locking the warning sign in place. Size is 27 in. high by 18



Type "A" Safety Standard

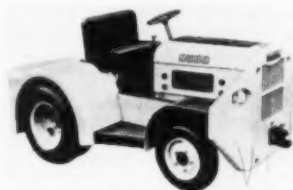
in. wide; brilliant baked enamel red frame, yellow sign with black lettered legend. Reflectorized warning signs are also furnished for 24-hour visibility through heavy rains or snowfalls. Eastern Metal of Elmira, Inc., Dept. RS, Elmira Hts., N. Y.

For additional information circle number of this item on Readers Service Card.

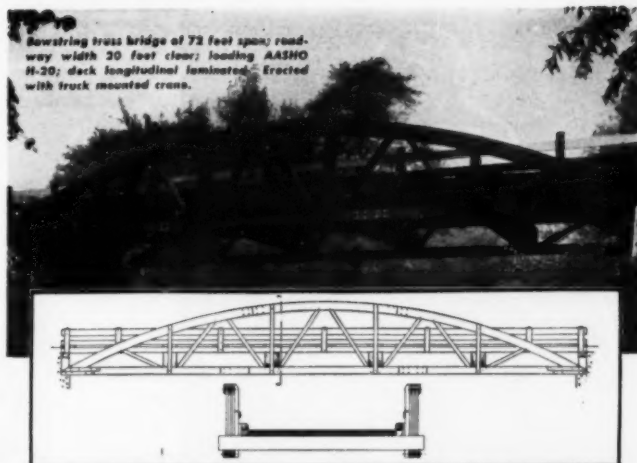
20

Shop Mule Tractor

A new 12,000 lb. drawbar pull tractor with torque converter designed to handle tough pulling and pushing jobs is now



Buda Model MA-120 Shop Mule Tractor



Bowstring truss bridge of 72 feet span; roadway width 20 feet clear; loading AASHTO H-20; deck longitudinal laminated. Erected with truck mounted crane.

Permanent, Economical Bridges through engineered timber construction

This timber bowstring bridge tells a powerful story of how to get economical adequate bridges that will give long-time service without costly maintenance.

Top and bottom chords are glued laminated timbers composed of kiln dried material permanently "welded" together under pressure by glues which are stronger than the wood itself. These members are dimensionally stable, and will not shrink, twist, check or warp.

All parts of the bridge are precision fabricated, preservatively treated and delivered to the jobsite ready for fast, easy assembly and erection.

Readily available at Timber Structures, Inc. are all types of timber bridges, including arches, bowstring truss, parallel chord truss, girder, and timber-concrete composite deck. Engineering facilities are available, when desired, to supplement those of your staff or to undertake the engineering work involved in the bridge design.

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LAUSON
ENGINES
RUN cooler!
LAST longer!

Only Lauson has a stream of cool air directed over both valves at the same time! . . . greatly reducing engine heat! Another Lauson feature is the cylinder — with extra fins and special head for dissipating heat faster — resulting in cooler operation. These extra engineering refinements . . . and many more add up to true dependability and longer engine-life . . . two factors that make Lauson the best engine buy, anywhere!

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OUTBOARD MOTORS

LAUSON

PORTABLE ENGINES

THE LAUSON COMPANY

New Holstein, Wis., U. S. A. Div. of Hart-Carter Co.
 In Canada: Hart-Emerson Co. Ltd., Winnipeg

being manufactured by The Buda Co. The tractor is powered with a 6 cylinder, 230 cu. in. displacement Buda model 6-B-230 gasoline engine. An optional equipment this tractor is available with a Buda model 6-BD-230 diesel engine of the same large displacement and interchangeable mounting dimensions. The Buda Co., Dept. RS, Harvey, Ill.

For additional information circle number of this item on Readers Service Card.

21

Material Handling Tractor

Addition of the Model 3600 tractor to its line of material handling equipment has been announced by Kalamazoo Manufacturing Co. The tractor is powered with a 13 h.p. Wisconsin engine through an automotive type clutch and three speed and reverse transmission. It is stated that as many as ten loaded



Model 3600 Tractor

trailers can be pulled with this tractor, and a loading space of 11 sq. ft. on the tractor itself can be utilized for additional loading.

For additional information circle number of this item on Readers Service Card.

22

Tractor-Loader Combination

A new Oliver-Ware tractor-loader combination has been announced by The Oliver Corporation. The new loader is for mounting on the Oliver Model "B" wide gauge crawler tractor. Advantages claimed include: The unit provides maximum operator visibility. There is no possibility of track-frame or loader arm distortion. The hydraulically controlled bucket permits great breakout action, full bucket loads and controlled bucket discharge. Hydraulic accumulator reduces vibration to the minimum . . . saves strain on equipment and operator. Pumps are engine-crankshaft driven for continuous, uninterrupted operation. Built-in bucket equalizer is standard equipment. The Oliver Corporation, Industrial Division, Dept. RS, 19300 Euclid Ave., Cleveland 17, O.

For additional information circle number of this item on Readers Service Card.

23

Double-Acting Pile Hammer

A new size and model of double-acting pile hammer, announced by McKiernan-Terry Corporation, Dept. 111, 15 Park Row, New York 38, N. Y., is designed primarily for driving steel sheet piling in close quarters. It is stated to be capable of driving one pile between two adjacent sheets, and to be ideal for driving in sand. It normally operates at 280 blows per minute, with an energy of 3200 foot-pounds per blow, and is suitable for 8-in. to 15-in. steel sheet piling or 6-in. by 12-in. wood sheeting or the equivalent size of round timber piles.

For additional information circle number of this item on Readers Service Card.

24

Mower-Loader Attachment

A new attachment for its standard tractor-loader unit, announced by the Oliver Corporation, is a hydraulic mower which can be installed quickly and easily for a few hours or days of mowing and then just as easily removed. The cutter bar is driven by the hydraulic pump of the loader so no separate power units are required. Mower will cut anything from thick, matted grass to moderate brush. Hydraulic safety mechanism

practically eliminates knife damage. Operator can cut right up to obstruction . . . hydraulically raise the cutter bar . . . go right on mowing. The Oliver Corporation, Industrial Division, Dept. RS, 19300 Euclid Ave., Cleveland 17, O.

For additional information circle number of this item on Readers Service Card.

25

Fog "Gun" for Fighting Fires

A fog "gun" developed by Bete Fog Nozzle, Inc., makes it possible to convert ordinary garden hose into a mobile and effective fire fighting weapon. It is a smaller edition of the fog equipment used by practically all fire departments. With the new gun-type nozzle, a water



Bete Fog "Gun"

pressure of only 30 to 120 lb. will produce an effective fog that will instantly blanket and extinguish small fires. What's more, such fog is effective against practically any kind of fire—oil, textile, electrical, wood, etc. This Bete nozzle has instantaneous trigger action and a positive shut-off. Bete Fog Nozzle, Inc., Dept. RS, 85 Pierce St., Greenfield, Mass.

For additional information circle number of this item on Readers Service Card.

WITH THE MANUFACTURERS & DISTRIBUTORS

Export Company Moves Offices. The National Supply Export Corporation which, for the past 17 years has had its offices at 30 Rockefeller Plaza, New York City, has moved to the 20th and 21st floors of a new building at 600 Fifth Ave., New York City. Also making the move is office of the Export Department of the Engine Division of The National Supply Co. and the New York Office of the Spang-Chalfant Division of National Supply.

Appointed Chief Consulting Engineer. C. M. Maratta has been appointed chief consulting engineer of The Timken Roller Bearing Co., Canton, O. He has been with the company since 1917 and has filled the position of plant maintenance engineer and chief works engineer.

P & H Appointment. John H. Taylor, Jr. will handle P & H excavator sales in the Philadelphia area. He leaves the post of assistant sales manager of the Large

Excavator Division of the Harnischfeger Corporation in Milwaukee for his new post.

Timken Promotions. The Timken Roller Bearing Co., Canton, O., has announced the following promotions: R. A. Schimpf, with the company since 1928, has been appointed chief works engineer; H. J. Urbach, with the company since 1933, has been appointed executive engineer; L. A. Holder, with the company since 1928, has been appointed chief mechanical engineer.

Elected President Carver Pump. Gordon L. Chapman, heretofore vice president, has been elected president of Carver Pump Co., Muscatine, Ia. Roy J. Carver, founder of the company, was ele-

vated to chairman of the board. Mr. Chapman joined the company in 1948 as comptroller. In July of that year, he was elected vice-president and a director. He has been the active head of the company much of the time due to the extensive foreign travel of Roy Carver on export matters. A graduate of Illinois in 1935, Mr. Chapman spent several years with Touche, Niven, Bailey & Smart, Public Accountants, and later as an executive in Chicago companies before coming to Carver.

New District Sales Engineers. Chain Belt Co., Milwaukee, Wis., has announced the appointment of five new district sales engineers. Edward D. Williams has been assigned to the Philadelphia District sales office. Truman J. Hammel, will work

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A STYLE
& SIZE FOR
EVERY
REQUIREMENT

MOLDBOARD

ALLOY STEEL for strength.
ROLLED SMOOTH for less resistance.
ADJUSTABLE for pitch.
SPRING MOUNTED deflectors.
ADJUSTABLE and oscillating shoes.

HITCH

LEVEL Lift.
TAILORED to truck to distribute weight and stress.
4 OR 6 POINT push using Wausau's exclusive toggle.

CHAFING for side thrust.

WAUSAU SPREADERS

Trailer Type

Positive control of Thickness
Positive control of Width
Positive control of Direction
No hazards to passing vehicles
Low Cost self contained unit
A differential drives the hopper agitator and spinner disc which prevents skidding and consequent loss of spinning power while turning corners.
Attached or disconnected in a minute
Model A Operator platform "Safety Built"
Long life construction -- Sturdily built
Spreads Materials from 8 to 20 Feet

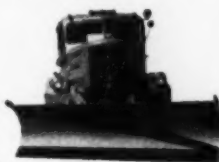
Write for details



WAUSAU IRON WORKS

PIONEER SNOW PLOW BUILDERS
WAUSAU, WISCONSIN

Sold and Serviced By Leading Equipment Distributors



out of the Kansas City office. R. W. DeMott Jr. has been assigned to Chain Belt's New York district sales office. Kenneth Burch, will work out of the Cleveland District sales office. George Robichaud has been assigned to the Boston District sales office.

Heads New Rochester Branch. L. M. Evans, has been put in charge of the new Rochester, N.Y. branch office of Worthington Pump and Machinery Corporation, Harrison, N.J.

Named Heli Chief Engineer. George W. Monk, chief engineer of the Tractor Equipment Division of Bucyrus-Erie Co. for the last 13 years, has been appointed chief engineer of The Heli Co., Mil-

waukee, Wis. He will serve in the newly erected post as an assistant to Arnold F. Meyer, vice president in charge of engineering and aid in the development of a broader road machinery program.

Ernest E. Louis Retires. Ernest E. Louis, assistant to Harry M. Francis, sales vice president, American Steel and Wire Co., has retired after 39 years continuous service with this U.S. Steel subsidiary.

New Huber Distributor. Equipment Inc., Highway 80, Jackson, Miss., has been appointed distributor of the road maintenance equipment of Huber Manufacturing Co., Marion, O. in the southern half of Mississippi.

Heads P & H District Office. James C. Ray has been appointed district manager of the P & H Jacksonville office. He joined P & H in 1940 and has served in the Jacksonville area as an excavator salesman.

Named FWD Service Manager. Charles Glocke, for the past 6 years field service manager, has been appointed manager of the service division of the Four Wheel Drive Auto Co., Clintonville, Wis.

MANUFACTURERS' LITERATURE

26

Pipe Laying Equipment

A new 12-page booklet, titled "International Power Lowers the Boom on Pipelaying Costs," has been published by the International Harvester Co. The part International crawlers play in handling every phase of the pipelaying business is presented in picture-caption style. In addition, the two-color booklet contains a Selectograph showing the lifting capacity of each International tractor when working with a matching Superior pipeboom. International Harvester Co., Dept. RS, 180 North Michigan Ave., Chicago 1, Ill.

27

Hose Fittings and Line Oilers

A bulletin and a specification sheet—the first in a series to supersede the Blue Brute accessories catalog—have been announced by Worthington Pump and Machinery Corporation. The first, Bulletin H-1200-B44, on Blue Brute Hose fittings, includes sizes, parts numbers and applications. The fittings include hose nipple, union nut, hose clamp, coupling spud, reducing coupling spud, spud, reducing spud, threaded pipe nipple, hose valve and splicing nipple. The second, Specification Sheet H-1200-B45, pictures and describes the Blue Brute 2 Qt. line oiler, giving detailed specifications. Worthington Pump and Machinery Corporation, Dept. RS, Dunellen, N. J.

28

Hydraulic Puller

New 8-page bulletin on the new OTC Power-Twin hydraulic puller (capacity 17½ tons—weight 10 lb.) describes how the Power-Twin with its "Center Hole" feature adapts itself to all OTC pulling systems now in use. Illustrates time-saving methods for installing and removing cylinder sleeves, shafts, gears, wheels and many other usages. Also shows conversion sets, new bench presses and Hydratote, portable storage for all parts plus a sturdy press. Owatonna Tool Co., 435 North Cedar St., Owatonna, Minn.

29

Truck Tire Conservation

Containing easy-to-understand information on the subject of tire conservation, a new 8-page booklet "9 Ways to get More Miles Out of Truck Tires" has been published by The B. F. Goodrich Co. The nine methods to have tires provide their maximum service are: Proper selection of tire for the job; correct in-



A special 22 cubic yard capacity Marion Body with Telescopic Hoists—installed on a tandem semi-trailer.

Hydraulic Hoists

Hydraulic Hoists—Through sound engineering and skillful use of high quality materials, Marion has produced a variety of standard and special hoists for efficient dumping service. Marion's extra attention to detail pays off "on the job" in dependable, economical . . . more profitable operation.

Dump Bodies

Dump Bodies—Marion bodies are designed with built-in endurance to withstand the hard knocks of heavy haulage duty. Marion's stronger, all-welded construction means longer body life, less maintenance cost . . . real over the years dependability.

Your near-by Marion distributor can furnish genuine Marion parts and factory "know-how" for your service and repair needs. It pays to deal with an authorized Marion distributor.

MARION
BODIES AND HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO, U. S. A.

Standard and Special Hoists and Dump Bodies for Light, Medium, and Heavy-Duty Service

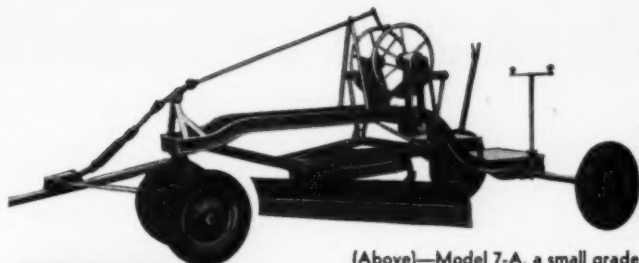
flation; correct loading and load distribution; correction of mechanical defects; proper care of tubes; regular rotation of tires; proper matching and spacing of duals; savings through recapping and repairing; and proper driving habits. Text of each of the subjects is short, informative and illustrated. A truck tire load and inflation table and a dual spacing table are among the features. B. F. Goodrich Co., Dept. RS, Akron, O.

30 Steel Drafting Tables

One page illustrated bulletin catalog sheet gives complete information on and describes many advantages of the new Stacor steel drafting tables. The Stacor 4-post drafting table is available with one shallow and one tool drawer, with tool drawer only, or without drawers. All models, in hard baked grey enamel finish, have all-steel 4-post base all-steel foot rest and 2 all-steel adjusting devices. Also described are finger-tip adjustment drawing tables. Stacor Equipment Corporation, Dept. RS, 1891 Atlantic Ave., Brooklyn 33, N. Y.

31 Power Transmission Drive

A complete catalog is now available on the revolutionary, new HY-VO power transmission drives recently announced by Morse Chain Co. The catalog, No. C 72-51, includes: A basic discussion of the operating principles behind chain drives; highlights of the new design principles incorporated in HY-VO Drives; description of what the drive will do in the field of high-speed, heavy-duty power trans-



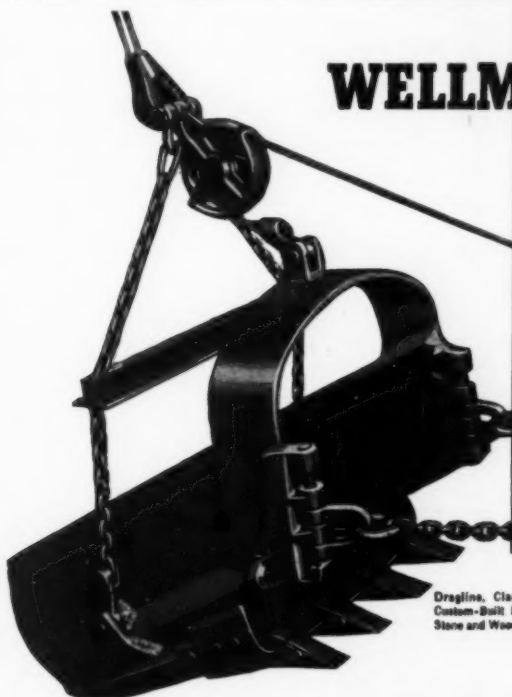
(Above)—Model 7-A, a small grader but a big performer with many good features. Also, the Model 80, heavier, better for high banks with its longer reach.

(Left) — A compactly designed, strongly built, reasonably priced earth mover that can be used with any tractor. Made in 1 yd. and 2 yd. sizes. Hydraulic controls.



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GALION, OHIO



WELLMAN *Williams Type*

MORE YARDAGE PER DAY

● Elimination of excess materials and careful weight distribution permit rapid, rhythmic operation of Wellman Dragline Buckets. Operators can cover a wider digging radius with this streamlined bucket.

Built of special alloy steel, using strong welded design, Wellman buckets provide strength and stamina for long-term economy. Perforated designs also available. You'll do better with Wellman.

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1. For latest information on any product you need in roadbuilding, earth moving heavy construction, etc., use business-reply card inserted in this publication. Just fill in our code numbers on blank lines of Part "C" of the postcard, fill in name, address, etc., tear out, and mail.

2. For information on particular products advertised in this issue, use Part "A" of the bound-in cards.

3. Part "B" of the cards is also usable for further information on any items described in the "New Equipment and Materials" or "Manufacturers Literature" sections of the magazine.

A		K	
7201 Acetylene Gas	2002 Cement, Asphaltic	6204 Engines, Distillate	1803 Kettles, Bituminous
2001 Additives, Bituminous	3002 Cement, Portland	6205 Engines, Gasoline	
7001 Agitator Bodies, Truck	3003 Cement, Quick-Setting Portland	6602 Excavators, Slackline Cableway	
6201 Air Cleaners	3004 Cement, White		
1001 Air Compressors	3205 Centering, Concrete Arch Form		
1002 Air Comp., Self-Propelled	3005 Center Strip Materials, Road		
3018 Air Entraining Agents	7401 Chain		
1003 Air Tool Accessories	1206 Chain, Conveyor		
3201 Anchor Rods (Bridge)	2811 Chutes, Concrete and Dry Material		
3202 Arches, Corrugated Metal	6406 Clearing Equipment, Tractor-Mounted		
2002 Asphalt Cement	3601 Cleaning Solvents		
2003 Asphalt, Emulsion	2602 Cleaners, Cement Bag		
2004 Asphalt, Liquid	5201 Compactors, Soil		
2005 Asphalt, Powdered	2618 Concrete Cutting Machines		
7002 Axles, Truck	2603 Concrete Placers		
	3206 Connectors, Timber		
	3006 Contruction Plates		
	5405 Control Equip., Cable		
	4004 Control Equipment, Hydraulic		
	1205 Conveyors, Belt		
	4802 Cranes, Crawler-Mounted		
	4803 Cranes, Hydraulic		
	6407 Cranes, Tractor-Mounted		
	4804 Cranes, Trailing, 2-Wheel		
	4805 Cranes, Truck-Mounted		
	4806 Cranes, Wheel-Mounted		
	6408 Crawler Tracks		
	3219 Cribbing, Retaining Wall		
	1218 Crushers, Gyratory		
	1207 Crushers, Jaw		
	1202 Crushers, Roll		
	3207 Culvert Cleaning Tools		
	3208 Culverts, Corrug. Metal		
	3209 Culverts, Sectional Plate		
	2618 Curb and Gutter Machine		
	2604 Curing Machines, Concrete (Spray)		
	3007 Curing Materials, Concrete		
	2813 Cutters, Bar and Rod		
	4001 Cylinders, Hydraulic		
B		L	
6801 Backfillers	2603 Concrete Placers	4403 Lanterns	
1004 Backfill Tampers	3206 Connectors, Timber	5803 Light-Collecting Machines	
1401 Batches, Agg. & Cement	3006 Contruction Plates	4404 Lights, Acetylene	
3602 Batches, Cement	5405 Control Equip., Cable	4402 Lights, Flood	
2801 Batches, Water	4004 Control Equipment, Hydraulic	4405 Lights, Flood (for Equipment)	
6202 Batteries, Elec. Storage	1205 Conveyors, Belt	4406 Lights, Warning (Electric)	
4601 Beads, Glass Reflecting	4802 Cranes, Crawler-Mounted	7608 Liner Plates, Tunnel	
7601 Bearings, Roller	4803 Cranes, Hydraulic	7609 Linings, Brake and Clutch	
6001 Belting, Conveyor	6407 Cranes, Tractor-Mounted	2202 Lips, Bucket	
2804 Belts, Concrete-Finishing	4804 Cranes, Trailing, 2-Wheel	5402 Loaders, Elevating, Belt Type	
2805 Benders, Bar	4805 Cranes, Truck-Mounted	5401 Loaders, Bucket	
2806 Bins and Hoppers	4806 Cranes, Wheel-Mounted	5403 Loaders, Front-End	
1007 Bits, Drill: Sharpeners	6408 Crawler Tracks	5404 Loaders, Truck-Mounted	
1005 Bits, Rock Drill	3219 Cribbing, Retaining Wall	3605 Lubricants	
1602 Bitum. Hot Patch Units	1218 Crushers, Gyratory	3606 Lubricants, Compressor and Air Tool	
2201 Blades, Grader, Loader and Scraper	1207 Crushers, Jaw	3607 Lubricants, Diesel Engine	
5601 Blades, Toothed (Ice Removal)	1202 Crushers, Roll	3608 Lubricants, Grease and Oil (Engine)	
	3207 Culvert Cleaning Tools	3609 Lubricants, Wire Rope	
	3208 Culverts, Corrug. Metal		
	3209 Culverts, Sectional Plate		
	2618 Curb and Gutter Machine		
	2604 Curing Machines, Concrete (Spray)		
	3007 Curing Materials, Concrete		
	2813 Cutters, Bar and Rod		
	4001 Cylinders, Hydraulic		
C		M	
7605 Cars, Industrial Railway	3210 Decking, Bridge (Open and Solid)	4809 Magnets, Lifting	
5801 Carts, Street-Cleaning	7606 Derricks	3805 Maintainers, Full-Type	
1204 Car Unloaders	2408 Dippers, Shovel	3804 Maintainers, Under-Tractor	
2407 Castings and Parts, Manganeese Steel	1802 Distributors, Bituminous	3806 Maintainers, Under-Truck	
3001 Cement, Air-Entraining Portland	3008 Dowels and Assemblies	7610 Melting Pots, Lead	
	4807 Draglines, Walking	1811 Mills, Grinding (Asphalt)	
	1215 Drags, Sand	1817 Mixers, Bituminous	
	5002 Dredges and Dredging Mch.	2610 Mixers, Concrete	
	1201 Driers, Aggregate	2611 Mixers, Mortar and Plaster	
	3401 Drills, Cable Tool (Well)	3807 Mowers, Highway	
	3402 Drills, Core	2612 Mud Jacks	
	3403 Drills, Earth-Boring		
	1016 Drills, Electric		
	3404 Drills, Electric Hammer		
	1009 Drills, Rock (Hand-Held)		
	1010 Drills, Rock (Tripod)		
	1011 Drills, Rock (Wagon)		
D		N	
3210 Decking, Bridge (Open and Solid)	7606 Derricks	7202 Hard-Facing Rods	
7606 Derricks	2408 Dippers, Shovel	1813 Heaters, Pavement-Surface	
2408 Dippers, Shovel	1802 Distributors, Bituminous	1814 Heaters, Tank Car (Bituminous)	
3008 Dowels and Assemblies	4807 Draglines, Walking	1815 Heaters, Tool (Bitum.)	
4807 Draglines, Walking	1215 Drags, Sand	1816 Heaters, Torch	
1215 Drags, Sand	5002 Dredges and Dredging Mch.	2819 Heaters, Water	
5002 Dredges and Dredging Mch.	1201 Driers, Aggregate	7607 Hoists, Electric	
1201 Driers, Aggregate	3401 Drills, Cable Tool (Well)	4003 Hoists, Hand	
3401 Drills, Cable Tool (Well)	3402 Drills, Core	4002 Hoists, Hydraulic (Body)	
3402 Drills, Core	3403 Drills, Earth-Boring	1012 Hoists, Pneumatic	
3403 Drills, Earth-Boring	1016 Drills, Electric	4808 Hoists, Power Drum	
1016 Drills, Electric	3404 Drills, Electric Hammer	6002 Hose, Air	
3404 Drills, Electric Hammer	1009 Drills, Rock (Hand-Held)	6003 Hose, Cement-Handling	
1009 Drills, Rock (Hand-Held)	1010 Drills, Rock (Tripod)	6004 Hose Couplings	
1010 Drills, Rock (Tripod)	1011 Drills, Rock (Wagon)	6005 Hose, Metal (Flexible)	
1011 Drills, Rock (Wagon)		6006 Hose, Suction	
		6007 Hose, Water	
E		O	
1210 Elevators, Bucket	2813 Cutters, Bar and Rod	1013 Oilers, Air-Line Air-Tool	
2814 Elevators, Cement (Bulk)	4001 Cylinders, Hydraulic		
4602 Enamels, Equip. and Sign			
6203 Engines, Diesel			
F		P	
3009 Fabric, Welded Wire	3210 Decking, Bridge (Open and Solid)	5003 Packing, Pump and Valve	
1211 Feeders, Aggregate	7606 Derricks	4605 Paints, Priming	
2006 Felt, Subgrade (Elastic)	2408 Dippers, Shovel	4603 Paints, Rust-Preventive	
7402 Fencing, Wire	1802 Distributors, Bituminous	4604 Paint Sprayers and Compressors	
4201 Filing Systems	3008 Dowels and Assemblies	4608 Paints, Traffic line	
2605 Finegraders (Subgraders)	4807 Draglines, Walking	4606 Paints, Traffic Line Marking (Reflecting)	
1899 Finishers (Pavers), Bituminous	1215 Drags, Sand	2613 Pavers, Concrete	
2606 Finishers, Vibrating	5002 Dredges and Dredging Mch.	3214 Pile Drivers	
2607 Finishing Machines, Concrete	1201 Driers, Aggregate	3221 Pile Hammers	
	3401 Drills, Cable Tool (Well)	3216 Piling, Bridge and Found.	
	3402 Drills, Core	3215 Piling, Steel-Sheet	
	3403 Drills, Earth-Boring	3211 Pipe, Drainage (Perf.)	
	1016 Drills, Electric	5001 Pipe, Dredge	
	3404 Drills, Electric Hammer	3217 Pipe-Joint Materials	
	1009 Drills, Rock (Hand-Held)	2008 Plank, Asphalt	
	1010 Drills, Rock (Tripod)	1818 Plants, Asphalt (Emulsified)	
	1011 Drills, Rock (Wagon)	2802 Plants, Batching (Conc.)	
		2803 Plants, Batching (Low-Bin, Portable)	
G		(List continued on opposite page)	
3212 Gates, Drainage	1214 Generator Sets, Engine		
1214 Generator Sets, Engine	1810 Generators, Steam		
1810 Generators, Steam	3801 Graders, Elevating		
3801 Graders, Elevating	3803 Graders, Motor		
3803 Graders, Motor	3802 Graders, Pull-Type		
3802 Graders, Pull-Type	3604 Graphite		
3604 Graphite	2409 Grapples		
2409 Grapples	3405 Grinders, Concrete-Surf.		
3405 Grinders, Concrete-Surf.	1212 Grizzlies		
1212 Grizzlies	3213 Guard Rails		
3213 Guard Rails			
H			
7202 Hard-Facing Rods	1813 Heaters, Pavement-Surface		
1813 Heaters, Pavement-Surface	1814 Heaters, Tank Car (Bituminous)		
1814 Heaters, Tank Car (Bituminous)	1815 Heaters, Tool (Bitum.)		
1815 Heaters, Tool (Bitum.)	1816 Heaters, Torch		
1816 Heaters, Torch	2819 Heaters, Water		
2819 Heaters, Water	7607 Hoists, Electric		
7607 Hoists, Electric	4003 Hoists, Hand		
4003 Hoists, Hand	4002 Hoists, Hydraulic (Body)		
4002 Hoists, Hydraulic (Body)	1012 Hoists, Pneumatic		
1012 Hoists, Pneumatic	4808 Hoists, Power Drum		
4808 Hoists, Power Drum	6002 Hose, Air		
6002 Hose, Air	6003 Hose, Cement-Handling		
6003 Hose, Cement-Handling	6004 Hose Couplings		
6004 Hose Couplings	6005 Hose, Metal (Flexible)		
6005 Hose, Metal (Flexible)	6006 Hose, Suction		
6006 Hose, Suction	6007 Hose, Water		
6007 Hose, Water			
J			
4006 Jacks, Hydraulic	2608 Joint-Cleaning Machines		
2608 Joint-Cleaning Machines	2609 Joint Installing Machines		
2609 Joint Installing Machines	3010 Joint Plates, Base (Waterproof)		
3010 Joint Plates, Base (Waterproof)	3011 Joint-Sealing Compounds		
3011 Joint-Sealing Compounds	3012 Joints, Pavement		
3012 Joints, Pavement			

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If you want more facts about any of the new equipment or the trade literature described in this issue, circle the proper numbers in section B of the card.

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Page _____ by _____ Page _____ by _____

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B 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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C _____

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My Firm or Govt. Dept. _____
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41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Catalogs describing the following products listed on opposite and following right-hand pages:

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Information about the products advertised on:

A Page _____ by _____ Page _____ by _____
Page _____ by _____ Page _____ by _____

More new equipment information or trade literature on items circled:

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41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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On the reverse side of this sheet is an opportunity for you to get quickly, efficiently and economically all the information you may need about:

A Products advertised in this issue of Roads and Streets.

B New equipment described in it or new trade literature mentioned, or

C Any other products—machinery, equipment, materials or supplies—that may interest you. A suggestive list—specially compiled and arranged for your convenience—appears on the two pages adjacent to this card. Consult it.

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Chicago 10, Illinois

Quick Help on Product Information

1604 Plants Bituminous (Portable)		R	2411 Skullcrackers	3410 Tools, Mechanics' (Construction and Equip.)
1601 Plants, Bituminous (Stationary)	3808	Rake Attachments for Graders	5602 Snow Fencing	2822 Towers, Material-Hoisting
1603 Plants, Bitum. Travel	6008	Reels, Hose	5603 Snow Loaders	7613 Track, Industrial-Railway
2809 Plants, Cement (Bulk; Portable)	3014	Reinforcing Bar Accessories	5604 Snow Plows, Blade and V-Type	6208 Tractors, Crawler
2812 Plants, Concrete-Mixing (Portable)	2203	Rippers and Rooters	5606 Snow Plows, Rotary (for Motor Graders)	6209 Tractors, Wheel
2810 Plants, Concrete-Mixing (Stationary)	1014	Riveters and Chippers, Pneumatic	5607 Snow Plows, Sidewalk	4609 Traffic Line Marking Machines
1208 Plants, Crushing and Screening (Portable)	5206	Rollers, Single Drum	5608 Snow Plow Wings	6603 Trailers, Flatbed
1209 Plants, Crushing and Screening (Stationary)	1801	Rollers, Grid-Type	4202 Soil Sampling and Testing Sets	6604 Trailers, Tilting
5405 Power Control Units Cable	5202	Rollers, Pneumatic-Tired	5208 Soil-Stabilizing Eqpt.	6605 Tramways, Aerial
5004 Power Plants, Portable	5204	Rollers, Tandem	1820 Spray Bar, Bituminous	6802 Trenching Machines
7008 Power Take-Offs, Truck	5203	Rollers, Sheepfoot	1805 Sprayers, Bit, Hand	2616 Truck Mixers
6206 Power Units	5205	Rollers, 3-Wheel	2615 Spreaders, Concrete	7011 Trucks, Motor
3218 Preservatives, Wood	5207	Rollers, Trench	1404 Spreaders, Dry Material	7007 Trucks, Industrial (Fork)
3406 Presses, Crawler Track Pin	2010	Rubber Road Materials	5805 Sprinklers, Street	7012 Trucks, Off-the-Highway
4801 Pull Shovels (Backhoes)	6207	Rust Preventives, Engine	2412 Steel, Alloy	7614 Tubing, Steel (Seamless)
6403 Pull Shovels, Tractor-Mounted		S	3015 Steel, Concrete-Reinforce.	U
6402 Pull Shovels, Trailing, 2-Wheel	2820	Salamanders	1008 Steel, Drill	3220 Underpasses, Pedestrian and Livestock
1213 Pulverizers, Hammer	1804	Sandals, Bitum. Paving	7404 Steel, Structural	V
5005 Pumps, Bituminous	4607	Sand Blasters	4203 Surveying Instruments	4007 Valves, Hydraulic
5014 Pumps, Centrifugal (Portable)	3408	Saw Rigs	5804 Sweepers, Street	1015 Valves, Safety (Air-Line)
5006 Pumps, Centrifugal (Stationary)	3407	Saws, Chain	T	2617 Vibrators, Concrete
5007 Pumps, Diaphragm	1402	Scales, Weigh-Batcher	4812 Tagline Controls	W
5008 Pumps, Displacement	1403	Scales, Wheelbarrow	7010 Tail Gates, Elevating	5408 Wagons, Dump
5009 Pumps, Dredge	2204	Scarifiers	1819 Tanks, Relay and Storage (Bituminous)	1217 Washers and Scrubbers, Aggregate
5010 Pumps, Gear	5407	Scrapers, Drawn	7612 Tarpaulins	4610 Waterproofing Compounds
5011 Pumps, Grease and Oil	5406	Scrapers, Self-Propelled	2009 Tar, Road	7203 Welding Apparatus
5012 Pumps, Hydraulic	2821	Screeds, Concrete	2205 Teeth, Bucket, Ripper, Scarifier, etc.	7204 Welding Rods
5013 Pumps, Jetting	2614	Screeders, Vibrating	3016 Tie Rods	3411 Wheelbarrows, Power
5016 Pumps, Pneumatic	1216	Screens, Vibrating	7615 Timber Construction, Laminated	2413 Wheels, Steel
5015 Pumps, Rotary	3809	Scythes, Power	6009 Tires, Construction Equipment	3810 Wideners, Highway
	6011	Shafts, Flexible	6010 Tires, Truck	4008 Winches
	2410	Sheaves and Pulleys, Wire Rope	3409 Tool Carts	3017 Wire, Form and Tie
	4810	Shovels, Crawler-Mounted	1812 Tools, Hand (Bituminous)	3009 Wire Mesh, Pavement
	6409	Shovels, Tractor-Mounted	2818 Tools, Hand (Concrete)	7405 Wire Rope
	7009	Shovels, Truck-Mounted		
	7615	Sign Painting Eqpt.		
	7611	Signs, Road		
	4811	Skimmers		

mission; HY-VO capacities, speed ranges and service factors for selecting drives; installation and lubrication procedures. Morse Chain Co., Dept. RS, 7601 Central Ave., Detroit 8, Mich.

32

Bucket Loaders

Three models of Hais bucket loaders are covered in an eight-page bulletin. The models are the 75, 77 and 75-SBC. Illustrations and drawings showing dimensions of the three models are given as well as their general specifications. Pictures show the loaders in action on various jobs. George Hais Mfg. Co., Inc., Dept. RS, Park Ave., New York 51, N. Y.

33

Darkener for Air Entrained Concrete

Horn AE dispersed black for use in darkening air entrained concrete is covered in a bulletin issued by A. C. Horn Co. Results of tests showing the favorable effect of this new carbon black dispersion on air entrainment, flow, strength, and freezing-thawing resistance of mortar and concrete are included. This AE dispersed black meets all specifications on color and compressive strength, and keeps the air in air entrained concrete. A. C. Horn Co., Inc., Dept. RS, 43-36 Tenth St., Long Island City 1, N. Y.

34

Diesel Electric Sets

A new 16-page booklet issued by Caterpillar Tractor Co. illustrates the wide usage of Caterpillar diesel electric sets on various power applications. It briefly outlines specifications of its models ranging from 21-KW to 314-KW. A special chart for self-regulated and externally-regulated sets is also featured. Additional information offers the reader the type of attachments available, simplicity of construction, portability, long life, performance and reliability of Caterpillar diesel electric sets. Caterpillar Tractor Co., Dept. RS, Peoria 8, Ill.

35

Tractor Equipment

A new catalog, Form No. 1106, covering the complete line of Trackson tractor equipment, is available. Products described and illustrated include the Traxcavators tractor-shovel teammates of matching "Caterpillar" diesel tractors. All five sizes of Traxcavators are shown including the hydraulic Traxcavator, Model HT4. Other machines illustrated and described include Trackson pipe layers, earth augers, tractors, swing cranes and land clearing equipment. Specifications are included for each unit. Trackson Company, Dept. P, Box 728, Milwaukee 1, Wis.

36

Roller Bearings

A new Shafer catalog No. 51 fully illustrates and describes the full line of Shafer products including pillow blocks, flange units, flange cartridge units, cartridge units, duplex units, take-up units, take-up and frame units plus unmounted roller bearings. The catalog contains complete engineering and load rating data and illustrates many product applications. Shafer Bearing Corporation, Dept. RS, 801 Burlington Ave., Downers Grove, Ill.

37

Tension Load Cells

Bulletin 325 on the new Baldwin Type P SR-4 tension load cells has been announced. These cells are based on SR-4 bonded resistance wire strain gages for load measurement. The 2-page bulletin illustrates and gives specifications for load cells of four capacities between 10,000 and 100,000 lb. M. L. Hall, Manager, Testing Equipment Department, Baldwin-Lima-Hamilton Corporation, Dept. RS, Philadelphia 42, Pa.

38

Grid Roller

A catalog featuring design and application of the grid roller for bituminous road salvage has been issued by the

**KEEP IT ANYWHERE
FOR TEST DRILLING**

Core drill can be mounted
on truck or jeep

The new Acker Terezo is so light, so compact, so simple that it can be mounted easily on truck or jeep and driven by separate motor or power take-off. Small as it is, the Terezo is a high capacity, fast-operating unit capable of extracting cores up to 2-3/16" in diameter and of drilling to depths of 600 feet.

Send for bulletin 3-A-RS.

ACKER DRILL COMPANY INC.

Scranton 3, Penn.

**LET AN
EAGLE
LOAD IT
FOR YOU**



**...AND YOU'RE
MONEY AHEAD**

● From stockpile or windrow this speedy, sturdy loader makes fast work of any loose material. Users like the idea that it requires only one man to operate it—that it puts away 3 to 5 yards per minute—that it gets from job to job at truck speeds. You'll like it, too, if you'll let it demonstrate what it can do!

Send for complete specifications—Folder 947-104

EAGLE
JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS **CRUSHER CO., Inc.** GALION OHIO U-5-A

Hyster Co. The six-page grid roller literature introduces the newest piece of equipment in the Hyster line and shows practical applications on highway salvage jobs throughout the country. Operation of the grid roller, towed by either a "Caterpillar" motor grader or tractor dependent on grades, is described in a seven-phase, step-by-step style. Details of the drums, grids and weight factors are fully interpreted. Hyster Co., Dept. RS, 2902 N. E. Clackamas St., Portland 8, Ore.

39

Civil Defense Communications

A new General Electric brochure pictorially presents typical communications systems now in use which can be coordinated into a dependable emergency communications network in any community. The brochure also describes the company's technical advisory service for civil defense radio communications. It lists G-E specialists in 22 district offices throughout the country, who are available without charge to analyze existing communications systems and recommend methods of forming them into a single network to operate in any peacetime or wartime emergency. Dept. N-5, G-E Advertising Division, Electronics Park, Syracuse, N. Y.

40

Manual on Hydraulic Control

A handy pocket-sized guide on the operation and care of the "direct acting" hydraulic control of P&H power cranes and shovels has been released by Harnischfeger Corporation. It tells operators how to get the utmost efficiency out of this modern system. The 28-page booklet contains complete information on the hydraulic control system and describes the correct procedure for dismantling, adjusting and replacing parts. Identification of parts is made easy by the use of numerous keyed photographs and cutaway drawings. A 4-page "fold-out" diagrammatic illustration shows the entire hydraulic system. Harnischfeger Corporation, Dept. RS, 4400 W. National Ave., Milwaukee 14, Wis.

41

Metal Lath Fire Resistant Ratings

A new comprehensive summary of metal lath and plaster fire resistive ratings—First Revision—April, 1951 has been prepared by the Metal Lath Manufacturers Association. There are four pages of tables, listing 85 fire-resistance ratings ranging from one hour to four hours. The summary gives the thicknesses required in providing metal lath and plaster fire protection for columns, steel beams, girders and trusses, various floor assemblies (including steel joist, cellular, and wood joist) and steel roof deck assemblies. Metal Lath Manufacturers Association, Dept. RS, Engineers Building, Cleveland 18, O.

42

Corrosion Control Coatings

A complete presentation on the characteristics, properties, uses and methods of application of synthetic rubber resin based coatings is contained in a new brochure issued by the Casey & Case Coating Co. Covered are machinery enamels, damp-wall enamels, stucco-masonry coatings and scuff-free floor finishes, all primarily formulated for maximum resistance to corrosion or

erosion. Casey & Case Coating Co., Dept. RS, P. O. Box 151, Maywood, Calif.

43

Earthmovers

Interesting highlights on "Caterpillar" high speed earthmovers, the new Cat DW20 tractor with its W20 wagon and No. 20 scraper and the Cat DW21 tractor and No. 21 scraper, is presented in a 24-page booklet. The booklet features the new 6-cylinder supercharged DW20 and DW21 diesel engine. It points out the exclusive fuel injection system developed by "Caterpillar" and includes design and performance data on the 225 HP engine. Additional information is presented in specifications of the DW20 and DW21, the No. 20S bulldozer, the No. 27 cable control, the W20 wagon, and No. 20 and No. 21 scrapers. Caterpillar Tractor Co., Dept. RS, Peoria 8, Ill.

44

Pile Hammer for Close Quarters Work

A bulletin describing its new double acting pile hammer, designed primarily for driving steel sheet piling in close quarters, has been issued by McKiernan-Terry Corporation, Dept. 111, 15 Park Row, New York 38, N. Y. The bulletin contains a sectional drawing, complete specifications, dimensions, parts list, and instructions for attaching angle iron guides.

45

Diesel Crawler Tractor

A new International TD-9 diesel crawler tractor catalog has been published by

International Harvester Co. A two-color presentation, the catalog contains detailed specifications and information on how the TD-9 develops and applies its 40.5 drawbar horsepower. Several varied job application scenes appear in the publication along with information on construction and operating features. The catalog may be obtained by requesting form CR-313-A. International Harvester Co., Dept. RS, 180 North Michigan Ave., Chicago 1, Ill.

46

Tar and Asphalt Hose

Tar and asphalt hose is described in a new folder issued by Chicago Metal Hose Corporation. This hose has been manufactured by the corporation for many years and is used extensively for many types of tar and asphalt road surfacing and repairing equipment. Equipment such as paving mixers, tar wagons, heaters and patch and spray equipment. It is also used for unloading tar from tank cars and for handling tar and asphalt at bulk plants. Chicago Metal Hose Corporation, Dept. RS., 1315 South Third Ave., Maywood, Ill.

47

Welding Alloy Specifications Chart

A new edition of their 6-page folder containing specifications on close to 100 different "Low Temperature Welding Alloys" used in welding, brazing, and hard surfacing of steel, alloy steels, stainless, cast iron, brass, bronze, copper, aluminum, magnesium, zinc die cast, etc., is available from Eutectic Welding

Alloys Corporation. Detailed information is given for each alloy and electrode, covering: type and preparation of joints; preheating of parent metal; color match rating with metals for which listed; approximate heat and corrosion ratings, etc. Included also, is a full page listing of "1001 Ways to Save in Your Plant," covering a variety of welding applications and the alloys recommended in each instance. Eutectic Welding Alloys Corporation, Dept. RS, 172nd St. and Northern Blvd., Flushing, N. Y.

48

Protecting Engineering Drawings

A handbook by the Remington Rand Management Controls Division points the way to maximum protection for engineering drawings. Entitled "How Safe Are Your Drawings?" The handbook SC 688 indicates the multiple dangers to drawings under defense or war conditions. The booklet shows the kind of fire-resistant protection drawings must have. Facts illustrating the fallacy of "fireproof" building protection are given in the booklet. Information on maximum protection against fire, use of safe-cabinets for drawings and other types of tested safe-files and map and plan units is also incorporated in the brochure. Remington Rand Inc., Dept. RS., 315 Fourth Ave., New York 10, N. Y.

49

Heavy-Duty Pipe Coupling

An illustrated bulletin describing its heavy-duty wedge-lock coupling for use on temporary or permanent pipe lines is available from Naylor Pipe Co. Speed

MORE YARDAGE PER HOUR PER DOLLAR

with a

SAUERMAN SCRAPER



Step up the yardage you move each hour—as you lower material handling costs—with a Sauerman Power Drag Scraper. This rugged, versatile machine combines digging, hauling and dumping in a continuous, one-man operation.

Crescent bottomless scoop, an exclusive feature of Sauerman Scraper machine, handles larger loads faster, using less power than similar sized scrapers—digs effectively in any kind of earth or bulk material.



Here a 1 cu. yd. Sauerman Scraper digs gravel from high hill and feeds screening plant at rate of 1100 tons a day, at an amazingly low cost.

Send today for new catalog

SAUERMAN BROS., INC.

588 So. Clinton St.

Chicago 7, Ill.

Every 100 units **Saves You \$4000**

PER YEAR COMPARED TO COST OF OPERATING KEROSENE FLARES



THE NEW AMAZING Neo-Flasher

WARNING LIGHT

Operational cost 1¼¢ per night

MODEL 1-100 C

Operates approx. 1,000 hrs. on one 6-volt Neo-Power Pak Battery (50 days and nights).

- No Wiring • No Maintenance • No Filling • No Cleaning • No Fuel • Waterproof • Brilliant Flash visible approx. one mile • Wind will not blow it out • No Fire Hazard • Clips to prevent theft • Guaranteed for Dependability and Ruggedness.

NEO-FLASHER 1-100 C designed for: Construction Jobs, Municipalities and Utilities, Police and Fire Depts., Airports

MAIL COUPON FOR FREE BROCHURE

LIGHT PRODUCTS, INC. Dept. 7R

407C COMMERCIAL CENTER, BEVERLY HILLS, CALIF.

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Address _____
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VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

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TOOLS — THE WORLD OVER —
NOTED FOR QUALITY AND DURABILITY™

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QUINCY, MISS.

CUT YOUR SWEEPING COSTS 75%

Wilshire POWER SWEEPER

Picks up everything from cigarette butts to pop bottles in one easy operation!

Write today for dealer nearest you and FREE on-Job DEMONSTRATION.

For dealer nearest you, write Dept. D-7

Wilshire
POWER SWEEPER CO.
530 W. Cherry Chase Drive
Glendale 4, Calif.



and simplicity of connection are features, according to the description, and a hammer is the only tool required to connect or disconnect the coupling. Complete specifications on this one-piece positive type coupling are included in range of light-weight pipe sizes from 8 inches to 30 in. in diameter. Naylor Pipe Co., Dept. RS., 1230 East 92nd St., Chicago 19, Ill.

50

Water Control Gates

A new folder tells how Armo gates meet water control needs. Easy operation, long service life, adaptability, and low cost are listed as several of their features which have resulted in the wide use of the gates in irrigation, flood control, drainage, sewage and water supply. Photographs show typical applications of some of the twenty-seven different models of Armo gates. Armo Drainage and Metal Products, Inc., Dept. RS, General Offices, Middletown, O.

51

Snow Melting Systems

Four highway snow melting systems are included in a study of 50 such systems in a 36-page bulletin of A. M. Byers Co. The book contains 83 illustrations, mostly showing the systems either operating or being installed, plus eight piping layouts for a variety of installations including loading areas, ramps, sidewalks, driveways, and highways. The text contains chapters devoted to: design, piping properties, use of anti-freeze, paving design and fill, fabrication and installation, installing and operating costs, operating practices controls, and auxiliary units. Engineering Service Department, Dept RS, A. M. Byers Co., Pittsburgh, Pa.

BLADES AND CUTTING EDGES of Superior Quality by Shunk

For all makes and types of road building and road maintaining machines. Also —

BULDOZER BLADES
BUCKET LIPS
PATENTED
SCARIFIER and
ICE and SNOW
REMOVAL BLADES
MOLDBOARDS
SCARIFIER TEETH

All widths, lengths, and thicknesses; accurately punched to fit your make of machine.

Write for bulletins and other information.

Shunk
MANUFACTURING
COMPANY
Established 1854
BUCYRUS, OHIO.

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THE EQUIPMENT OF SMITH CONTRACTING CORP. AT THEIR VIRGINIA YARD

\$1,500,000 VALUE, LITTLE USED, RECONDITIONED, MODERN
EARTH MOVING & PLATE FABRICATING EQUIPMENT

Subject to Owner's Acceptance or Rejection As Per Rules Posted at Premises

At Manassas, Va., 15 MILES S.W. OF
WASHINGTON, D.C.

Tuesday, Aug. 7,

STARTING
10 A.M. DST.

PARTIAL LIST OF THIS ALMOST NEW EQUIPMENT USED ON ONE OF THE INCH LINES

50 Tractors, TD24's—18's—14's—HD19's—D4's—D6's, etc., equipped with miscellaneous booms, blades, angles, bulls, winches, high lifts, etc.; 27 gas driven Lincoln Welders 200 amp.; 18 water pumps, gas driven 2 1/2" to 6"; 3 Buckeye Ditchers 48 & 51; 7 Air Compressors 210 to 500 CFM, Diesel and gas; 12 Dope Pots, Draglines, Hoes, Clams, Speeder Cranes; 23 Pick Up Trucks, mostly 1950 Chevrolets—low mileage; 50 Trucks, including

Henderson Diesel, KBR11 & 12, Chev., Dodge, Half Trucks; 8 Trailers, low-boys, etc.; Wagon Drills, Jack Hammer, Cutting and Beveling Machines, Alignment Clamps, Auto Release Tongs, Acetylene Cutting & Welding Equipment, Pipe Cradles, Yokes, Sling, Road Boring Machines, Root Rakes, Chain Saw, Dragline Buckets, Clams, Light and Power Units, Small Tools, Supplies, Drill Rods, Spare Parts, etc.

INSPECT AT ONCE—YOU CAN HAVE AN OPERATIVE DEMONSTRATION!

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P. O. BOX 671, WARREN, OHIO.
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PH. NILES, OHIO, 2-2509
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FOR SALE

- 2 Model "D" Roadster Tournapulls equipped with 8 yd. Scrapers, 800 hours.....\$32,500.00
- 1 TL 20 Self Propelled Truck Crane.....12,500.00
- 1 HD 10 Allis Chalmers Angle Dozer.....8,500.00
- 1 TD 14 International Angle Dozer.....7,500.00
- 1 Etnyre Bituminous Distributor Mounted on K-7 International.....4,500.00
- 1 D & Cat. Angledozer.....8,500.00
- 3 KR 11 International Dump Trucks, 6 yd. Rock Bodies.....9,000.00
- 1 Worthington Wagon Drill (New).....2,000.00
- 1 Tempo Sheepfoot Roller (Double Drum).....1,200.00

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4—KOEHRING DUMP-TORS

overhauled and in
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PRICE \$3,380 EACH

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D7 CATERPILLAR

DDPCU STRAIGHT BLADE
Low Hours \$13,500

UNUSED AIR COMPRESSORS

- 1—315 CFM Worthington D8800 Cat. Engine, Pneumatic Tires \$5,750.00
- 2—With Pneumatic Tires, \$2,450.00
- 2—With Steel Wheels, \$2,250.00
- 2—1/2-yard Maxi-Mile Wagon Cranes \$22,500.00

- 2—UNUSED UNIT Wagon Cranes, 12 tires, 25-ton capacity, \$22,500.00 each.

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1 50-ft. Lippman Conveyor, completely enclosed swivel turnhead, gasoline powered. Excellent condition. Reasonable.

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CRANES - TRACTORS - FORK LIFTS - COMPRESSORS
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REAR DRIVE UNITS - FRONT DRIVE UNITS - HUBS
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1951

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Joy Air Compressors, Tools

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USED EQUIPMENT FOR SALE

- 2—Shovel Fronts for 1/2 Yd. Bucyrus-Erie Type B Steam Shovels, Booms, Sticks and Dippers.
Condition: Excellent.
Price: \$500.00 each.

- 1—Electric Converter, Model FCE8 Reliance. 1 1/2 H.P.—8 KVA—440 V.—60 Cy.—3 Phase Continuous 40°C RPM 900.
Condition: Good.
Price: \$350.00.

- 1—Roll Crusher, Martin 18" Style F Condition: Good.
Price: \$400.00.

- 2—Well Drills, Loomis Model 44 Clipper Full Crawler Blast Hole. Gasoline Powered.
Condition: Excellent.
Price: \$4,500.00 each.

- 1—Scale, Exact Weight Style No. 2225, 10 lb. Tare Beam, Dial 25 lb. Under 5 lbs. Over with Dustite Bag-holder.
Condition: Good.
Price: \$200.00.

**THOMASVILLE STONE
& LIME CO.**
Thomasville, Pa.

J. K. WHEELER MACHINERY CO. Used Equipment Inventory List

- | Item No. | Description |
|----------|--|
| 1. | 1500 Gallon Emery Bituminous Distributor with front mounted engine, mounted 10 wheel K&B IHC Truck—Both truck and distributor very little used (200,000 Gal.) |
| 2. | 4 5-6 Ton Mack Gasoline Four-wheel Drive—Dual on Rear—8 Cu. Yd. Dump Beds with Hydraulic Twin Telescopic Type Hoists—Here is a deal for someone who has use for these units. |
| 3. | STANDARD, Almost New 1500 Lb. Batch Stationary Bituminous Oil Plant, complete with Tanks, Steam Boiler, D1000 Cat. Engine, "Ready To Go!" portable, skid mounted, with 5th Wheel arrangement on each unit, with set of Dollies for easy, quick moving. "PRICED TO SELL!" |
| 4. | Adum 12' Lay-Down Machine—very little used. |
| 5. | 2 12' Buckeye Spreaders with Agitators; equipped with 4 wheels—very little used. |
| 6. | Model LS-85 L-S-S Shovel & Dragline Combination, powered with D8000 Engine and equipped with 1 yard buckets. |
| 7. | Model YR 12-15 Yard LeTourneau Scraper. |
| 8. | Model LS—8-11 Yd. LeTourneau Scraper. |
| 9. | 1500 4 Compartment Fuel Tank mounted on Dodge Truck, with air compressor and Air Actuated Lubricating equipment. |
| 10. | Heavy Duty 3 Tooth Road Rooter—All condition. |
| 11. | Model LP 12-15 Yd. LeTourneau Carryall Scraper—Almost new. |
| 12. | D8 Caterpillar Tractor, 1H5265 SP with Angledozer and with 2 Drum LeTourneau Power Unit. |
| 13. | D7 Caterpillar Tractor, 9G198 SP with Bulldozer & 2 Drum LeT. Power Unit, BH 144C50. AT "GIVE AWAY PRICE." |
| 14. | D7 Caterpillar Tractor, with Bulldozer & 2 Drum LeT. Power Unit. Old, but offered at "GIVE AWAY PRICE." |
| 15. | 12 Yard LeTourneau Carryall Scraper, 268Y12. |
| 16. | 8 Yard LeTourneau Carryall Scraper, 508J. |
| 17. | D10 Caterpillar Auto Patrol, 9F1063-5H89. |
| 18. | Seaman Pulverizer, Model MHD-72, with extra set of fines. |
| 19. | Model 511 Diesel Adams Motor Grader with 12' blade—in running condition. |
| 20. | 1941 Diamond T Dump Truck, Model 948-A-3239, Motor No. 130219, Serial No. 9490288—with Winch & A Frame for Derrick. |
| 21. | Jaeger 7-5 Concrete Mixer, Model TEL-AP, Serial No. 71989. |
| 22. | Model 70 Buckeye ¾ Yd. Shovel & Dragline Combination, Serial No. 4964-W-172507. "NEAR NEW." |

**J. K. WHEELER
MACHINERY CO.**
1485 South 2nd West
SALT LAKE CITY, UTAH
PHONES 6-1212, 6-3431, 6-1514

FOR SALE

- 1 7-5 Construction Machinery Co. "Mastermiser" driven by 2 cyl. LaRoi gas engine, trailer mounted on 4 rubber tired wheels.
- 2 7-5 Construction Machinery Co. "Wondermiser" driven by 2 cyl. LaRoi gas engines, trailers mounted on 4 rubber tired wheels.
- 1 105 CFM Schramm portable compressor driven by Buda gas engine, trailer mounted on 4 rubber tired wheels.
- 1 210 CFM Worthington "Blue Brute" portable compressor, driven by Continental gas engine, trailer mounted on 4 steel wheels.
- 2 310 CFM Gardner-Denver portable compressors driven by Buda gas engines.
- 3 15 KW Diesel Electric Generating Units, Century 4-wire generators driven by Waukesha-Hesselman Diesels.
- 1 30 KW Diesel Electric Generating Unit, Century generator driven by Buda Diesel.
- 1 74 KW Caterpillar Diesel Electric Generating Unit, Model D-13000.

Mining and Milling Machinery Construction, Electrical and Industrial Equipment

Morse Bros. Machinery Co.
Established 1895

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FOR SALE

- 1—D7 Caterpillar tractor with bulldozer and angledozer combination, double-drum winch.
- 1—D7 Caterpillar tractor with LeTourneau tiltdozer & bulldozer combination, double-drum winch.
- 1—RD7 Caterpillar tractor with LeTourneau tiltdozer & bulldozer combination, double-drum winch.
- 1—LS LeTourneau scraper, 8.2-11 yd. capacity, has not moved 3,000 yds. dirt.
- 1—LeTourneau double-drum sheepfoot roller.
- 1—LeTourneau scarifier or roofer.
- 1—Rex 11-8 (2-bag) mixer.
- 1—Adams gas motor grader, new motor just installed, new rubber used very little.
- 1—Federal truck, new motor.
- 1—Chevrolet dump truck, four-wheel drive, new motor.
- 7—wheelbarrows.
- 3—Georgia buggies.
- 1—pair concrete scales.
- 1—750 gallon water tank, sprinkler attached.
- 1—hand saw.
- 1—hatch saw.
- 1—Kohler light plant.

Have many other pieces too numerous to mention. All above equipment is 85 to 90 percent as good as new.

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Phone 51

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New Model 1951 Insley K-12 with trench hoe & 35' boom attachments.

Page 1/2 yd. dragline bucket. This machine has only been used for two weeks. New machine at a used price.

Tandem trailer & tractor—Talbert 2-ton removable gooseneck low-boy, 18 months old. This trailer can be inspected at Huntley, Ill.

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TAKE ADVANTAGE of equipment demand HAVE AN AUCTION

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THE AUCTIONEERS**
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REX DUAL DRUM PAVER

Model 34E. Model duomatic, powered with 6-cylinder gasoline engine. Rex mechanical man, batchmeter, 35' distributing boom. Serial #GG-126. Completely reconditioned, ready for paving. Price on application, subject to prior sale. Can be seen at our Philadelphia warehouse. Write, wire, visit.

FURNIVAL MACHINERY CO.
54th & Lancaster Ave. Phila. 31, Pa.

FOR SALE

- 1—7 ton Plymouth gas locomotive, \$1400.
- 1—Symons double deck vib screen, \$600.00.
- 1—Worthington Pump with Motor, \$450.00.
- 60# Frog & switch points & G rails, \$120.00.

Numerous Motors—All this equipment in very good condition.

WAPAK SAND & GRAVEL CO.
WAPAKONETA, OHIO

FOR SALE

- 1—Chicago Pneumatic 315' air compressor, steel wheels.
 - 1—Yaun ¾ yd. dragline bucket.
 - 1—Williams ¾ yd. dragline bucket.
 - 1—Cleveland DR30 wagon drill.
 - 1—Jackshaft 8" 7½" with 2 V pulleys, 8 groove 15" PD & 2 pillow block bearings, 3-15/16 bore.
 - 2—Solid tire axles.
- Above can be seen at Millington, Ill., or phone Marseilles, Ill., Green 510, evenings.
- HARRINGTON STONE CO.**
MILLINGTON, ILLINOIS

FOR SALE

- 1—365 Gardner-Denver Diesel Air Compressor.
- 2—Cleveland Wagon Drills.
- 1—TD 18 International Tractor Cable Dozer, with double-drum power unit.
- 2—404 Rome Blades, Hercules Diesel.
- 4—13 cu. yd. bottom dump Euclids.
- 3—Caterpillar DW-10 with bottom dump wagons.
- Riaw Knox steel forms for 10 foot circular inside diameter concrete structures.
- 4—Sets 22 foot inside barrel forms.
- 2—Sets Travelers.
- 2—Sets 22 foot outside barrel forms.

Available on Rental Purchase Option
KEARNEY, CRUME & CO.
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**Caterpillar D8
Cable Dozer
Serial No. 2U 10457, 1950**

With cat. straight blade and DDCU mod. 25 condition and appearance like new.

Bucyrus Erie 15B 1950, Buda Gas
35 ft. crane boom, fairlead and dragline bucket also backhoe attachment, special cab. Machine practically new. Address

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57 Belmont Ave. Yonkers 4, N.Y.

FOR SALE

1 Caterpillar D8, Dozer, and P.C.U. Serial No. 202249. Price \$13,500.00.

1 Caterpillar D8, and P.C.U. Serial No. 2 U 5486. New Style Transmission, and LeTourneau FP Scraper with 2100 x 24 tires on rear, 1800 x 24 tires on front. Price \$16,500.00. Located at Murdo, South Dakota.

1 Northwest Model 25 Dragline, Serial 10208 with Cat D4500 motor. Price \$10,500.00.
1 International TD-14, now in 1949, used 3000 Hours. Serial No. TDE875. Price \$5,500.00.

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CONSTRUCTION CO.**

621-15TH AVENUE N.

FARGO - NORTH DAKOTA
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FOR SALE

Truck Crane: 1931 Universal Crane with New Waukegan Engine mounted upon a 1927 Mack Truck. Crane equipped with a 50 foot sectional boom; 8 wheels in rear; 2 wheels in front; all with pneumatic tires. Gross Weight—35,000 lbs.
Pumps: 100 H.P. : Allis Chalmers A.C. Motor with 6" Suction and discharge. Mfg. by Alberger Pump & Condenser Co. Capacity 750 gallons per min.
Pumps: Various Sizes of Horizontal Duplex Pumps manufactured by Worthington, Warren and Dean.

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1—N.W. Shovel

2½ c.y. Model 80-D
New late '46. Used 2½ years.
Serial Number 8931

1—N.W. Shovel

1½ c.y. Model 6
New in '46. Used lightly.
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Both machines in excellent Condition

Williams Construction Co.

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Telephone Essex 1310

FOR SALE

D-8 with 85 "Caterpillar". 3000 hrs.
¾-yd. crane and backhoe, Diesel.
Model M 6 to 7 yd. LeTourneau scoop.
All in excellent condition.

**J. P. Wetherby
Construction Co.**

1016 W. Superior St. Ottawa, Ill.

NOW AVAILABLE!

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|---|----------------|
| 1—D8 Caterpillar Tractor w/dd pcu and dozer..... | \$ 5,500.00 |
| 1—No. 12 Caterpillar Motor Patrol..... | 6,000.00 |
| 2—Super C Tournapulls..... | Each 7,000.00 |
| 1—4000 Gallon Dart Sprinkler Truck—Diesel..... | 9,000.00 |
| 1—400 KW Enterprise Dual Fuel Gen. Unit..... | 35,000.00 |
| 1—21 Shank Southwest Scarifier..... | 1,500.00 |
| 1—New Model HBL Buda Earth Drill..... | 5,000.00 |
| 10—26.7 cu. yd. Southwest Bottom Dump Trailers w/200 HP
Peterbilt Diesel Tractors..... | Each 16,500.00 |

Above equipment located at Republican City, Nebraska

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| 3—Mod. W. LeTourneau Carryalls—Duals..... | Each 6,000.00 |
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| 1—34E Ransome & Dual Drum Paver—Diesel..... | 14,500.00 |
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Phone — JUniper 4-8120 — Extension 107

or

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Republican City, Nebraska Phone Republican City 101

FOR SALE

AIR COMPRESSOR—Gardner-Denver 500 C. F.M., Powered with Caterpillar D-13000. Same as new. 630 hours running time.

AIR COMPRESSOR—Gardner-Denver 345 C. F.M., powered Caterpillar D-13000, excellent condition. 2,300 hours running time.

GENERATOR—Louis Allis powered Caterpillar D-3400. 25 KVA. 220 volt, three phase.

POWER UNIT—Caterpillar D-3400.

PUMP—Jaeger 40-M with 6-inch suction hose.

PUMP—Res, 20-M.

HOISTS—Two gasoline powered. One electric.

ELECTRIC MOTORS—2 to 15 H. P. Single and three phase.

**ALL EQUIPMENT READY TO GO
EXCELLENT CONDITION**

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Model 120 Buckeye Ditcher (Practically new)

HD-14 Allis-Chalmers Cat Tractor equipped with 8-12 C. Y. LeTourneau scraper and Caterpillar dozer.

6-Ton Mack truck tractor—4 wheel drive.

1 45-ton semi trailer.

SWINGEN CONSTRUCTION CO.

Write BOX 624

GRAND FORKS - NORTH DAKOTA
Phone 45259

FOR SALE

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PRIOR DISPOSITION**

Lima 1201 High Lift Shovel, Long Crawler, wide tread, Cummins Type L Diesel, 42' Boom, 32' Stick, 2½ yd. Dipper. Very good condition. Serial 3131.

\$42,000 FOB Johnston, Pa.

93M Marion 2½ yd. Standard Shovel, Caterpillar D-17000 Diesel, 1500 Watt Light Plant, 2½ yd. Dipper. Good condition. Serial 8780.

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111M Marion. Combination Shovel, Dragline, 4 yd. Dipper, 89' Dragline Boom, Fairleads, 5 yd. Hendrix Bucket, Two General Motors Diesels. Good condition. New 1947. Serial 8608.

\$48,250 FOB Johnston, Pa.

Also Rear and Bottom

Dump Euclids

WILL CONSIDER RENTAL

3-C-11 Tournapulls with E-16 Scrapers. Machine and tires in good condition.

\$12,000 Each FOB Swedesboro, N. J.

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NEW DIRT MOVING OUTFITS—IN OUR STOCK

Five (5) Diesel Powered Bottom Dump Wagons—8½ yd. level capacity
—NEW earth mover tires—NEW International ID-9 Diesel Hauling Tractors—Dual Rear—Never used (account order Cancellation)—Priced approximately 60% New Cost—Dealers protected.

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- 1948—Ford F8 Dump, 4 yd.
- 1942—FWD Chassis and Cab. 1400x20 tires. Model CU-COE
- 1947—Ford Chassis and Cab
- 1947—GMC Chassis and Cab
- 1946—Chevrolet Chassis and Cab
- 1945—Ford 1½ ton dump
- 1942—Ford 1½ ton dump
- 1942—International 1½ ton dump
- 1942—International platform body
- 1942—FWD Tractor and Trailer
- 1941—Dodge Chassis and Cab
- 1941—Ford ¾ ton, panel
- 1940—Mack 2½ ton dump
- 1940—Ford 1½ ton dump

We are not mentioning prices, but these trucks are to be sold regardless of cost. If we have what you can use, your price will interest us.

Immediate deliveries on most models of brand new Internationals—From LI-10 to L2-10.

We have just received 8 International LI-84 dumps, brand new, also 3 International LI-64 dumps, brand new.

Mention this ad for a special deal.

FRED F. CAIN, INC.

580 Main St. Wilmington, Mass.
Tel. Wilmington 385

FOR SALE

- 1—500 cubic ft. CPT Co. Air Compressor with 13000 Caterpillar.
- 1—Trench Machine. Excavate 24 to 36 inch width, up to 14 ft. deep.
- 1—200 Rex pumpcrete with 500 ft. pipes.
- 1—D7 Cat. with La Plante angledozer.

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5044 Carol Ave.
SKOKIE, ILLINOIS

FOR SALE OR RENT

Lima Model 1201 Combination Crane (10 ton Capacity), High-lift 2½ yard Shovel, 100' boom dragline. 1950, only used eight months, like new.

International Tractor TD-24. Model H front mounted winch. Isacson Model KSF 24 bulldozer blade. New September 1950, 570 hours.

BRUCE CAMPBELL

Box 72
Madisonville, Kentucky
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FOR SALE**Used Tires and Tubes**

8 1200 x 24 8 Ply Seiberling @ \$145.00. Tax Incl. (New).

2100 x 24 Recaps, 1600 x 20 16 & 12 Ply, 1400 x 20 16 & 12 Ply.

1300 x 24 16 & 8 Ply, 1300 x 20 16 Ply, 1200 x 24 12 & 8 Ply.

1200 x 20 12 Ply, 1100 x 24, 22, 20 12 Ply, 1000 x 24, 22, 20 12 Ply.

900 x 24 Hi Rib, 900 x 24 Conv., 900 x 22, 900 x 20, 900 x 18, 900 x 15 LoBoy, 825 x 24 Hi Rib, 825 x 20, 825 x 18 Conv.

825 x 15 Lo Boy, 750 x 24, 20, 17, 16, 700 x 20, 18, 17, 16.

All size small commercial type tires, incl. 750 x 15 Lo Boy.

Large size tractor, 15-34 8 ply, 15-30's etc. Used rubber tubes for all sizes listed.

G & G SALES CO.

2190 Marshall Ave. St. Paul 2, Minn.
Midway 9704

USED CATERPILLAR**DIESEL ENGINES AND ELECTRIC GENERATING SETS**

SUBJECT TO PRIOR SALE
We offer for Immediate Delivery

USED ENGINES

1-Caterpillar Diesel D13000 Pr. Unit Arret. "V"-150 Max H.P. with open clutch, extended shaft and outboard bearing. This unit completely rebuilt in our shops and carries a new machine guarantee. Price F.O.B. Madison, Wis.—\$4500.00.

1-Caterpillar Diesel D11000 Pr. Unit Arret. "V"-125 Max H.P. with open clutch, extended shaft and outboard bearing. This unit completely rebuilt in our shops and is in real excellent condition. Price F.O.B. Milwaukee, Wis.—\$3500.00.

1-Caterpillar Diesel D-3400 Pr. Unit Arret. "H"-54 Max. H.P. with enclosed clutch. This unit runs in our shops. Excel. cond. Pr. F.O.B. Eau Claire, Wis.—\$1500.00.

1-Cummins Diesel Elec. Set with Direct Current 40 KW 240 Volt generator, Excel. cond. Pr. F.O.B. Milwaukee—\$1400.00.

1-Caterpillar Diesel D17000 Electric set, self regulated no switchboard required. Continuous rating 100 KVA—65 KW—220 Volts—3 Phase—60 Cycle with gasoline starting engine, radiator with blower fan, safety shutdown and muffler. Unit is completely reconditioned and is good as new. Price F.O.B. Madison, Wis.—\$7000.00.

NAGLE-HART TRACTOR & EQUIPMENT CO.

MADISON — MILWAUKEE — EAU CLAIRE

FOR SALE

International TD24, purchased May, 1950, equipped with Isaacson hydraulic angle dozer and Bucyrus-Erie P29 power unit. Also Gar-Wood 17-20 yard scoop—purchased July, 1950. All in excellent condition.

PAISLEY-SMITH COAL CO.

P. O. Box 70 Mt. Sterling, Illinois

WANTED**FOR SPOT CASH**

NEW TRACK Assemblies or Parts for D8 & D7 Tractors.
Contact

EVANS AND EDELL

159 West 22nd St.
NEW YORK 11, N. Y.
ALGONQUIN 5-3800

FOR SALE**Model 201 Buckeye Ditcher**

Twin City Gas Engine. 27 foot max. cut. Ladder Type. Machine in good condition throughout.

LOCATED IN OKLAHOMA

Pennington-Winter Constr. Co.

P. O. Box 5051 Oklahoma City

FOR SALE OR RENT

1 OSGOOD, 1½ yd. dragline with GM 671 diesel, used 900 hours \$20,500.00

1 NORTHWEST 194, 1½ yd., running condition 3,900.00

4 TOURNAPULLS, Mod. C, with Caterpillar diesel engine, one has new tires, other three have very good tires. All for 22,500.00

1 CLETRAC, Mod. FD., with Hercules diesel engine and 12" hydraulic dozer 5,500.00

1 ALLIS-CHALMERS, Model L, with Le-Tourneau cable dozer, had recent engine overhaul 2,500.00

1 ALLIS-CHALMERS, Model L, no attachments, had recent engine overhaul 2,500.00

2 ONAN, 5KW light plants, 110V A.C., like new, Each 600.00

HARRY M. RIGHTER, INC.

1422 West 28th St. - Phone CHerry 1-5040
Cleveland 13, Ohio

FOR SALE

1—Hystaway clam and drag combination for mounting on Cat. D-7, including half yard PM heavy duty clam bucket and half yard Esco dragline bucket, unit used only sixty days, immediately available \$7,000.00

1—Allis-Chalmers Model HD 14 Crawler with Baker Hydraulic Angledozer and Cat. Push Block 7,500.00

All above equipment f.o.b.
St. Ignace, Michigan

Straits Engineering Co.

P. O. BOX 438 PHONE: 3472
SAULT STE. MARIE, MICHIGAN

FOR SALE

PD 40 International w/ clutch.
UD 9 International w/ clutch.
G.M. 671 w/ clutch, 37 kva, 230 volt, 60 cycle alternator attached.

CHURCHILL CONSTRUCTION CO.
1126 State Street Lima, Ohio

CRAWLER CRANE

Kayston Model 19A with 120 HP Cummins Diesel, 50 ft. boom can be extended. Can be converted to clamshell, dragline or 1½ cu. yd. shovel.

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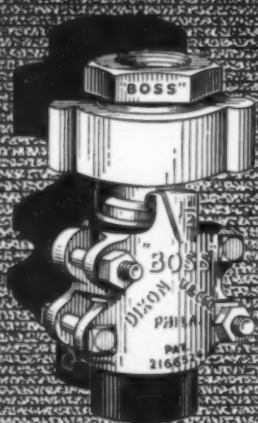
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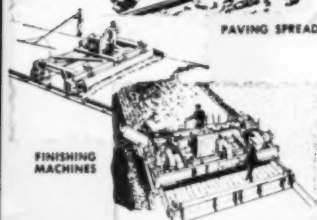
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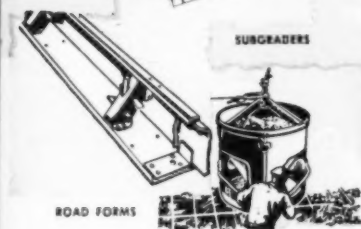
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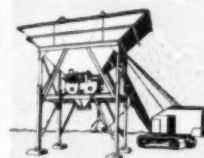
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